TRANSACTIONS

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and
OTOLARYNGOLOGY

NOVEMBER - DECEMBER
1960

Volume 64 No. 6

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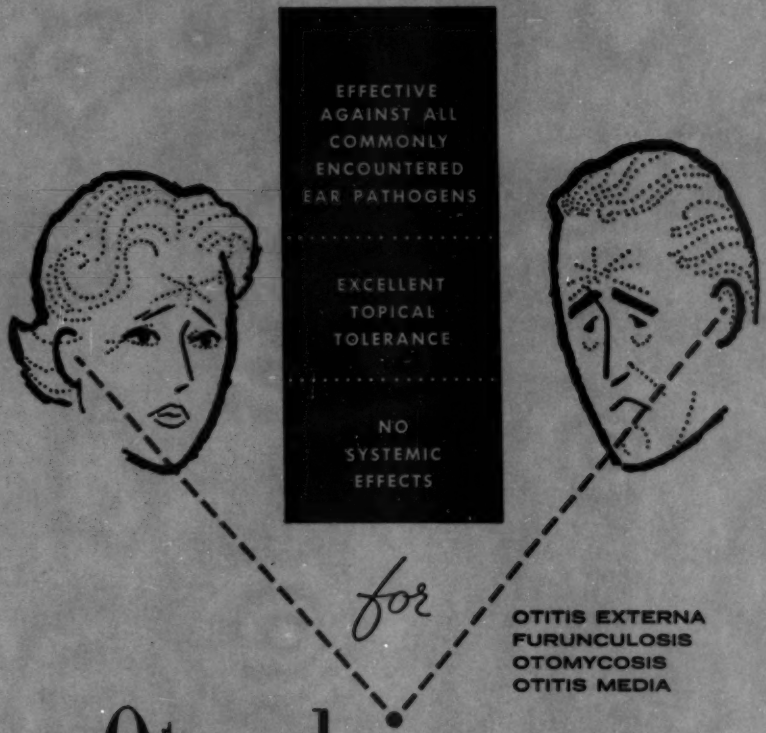

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2. *M. Times* 84:741, 1956.
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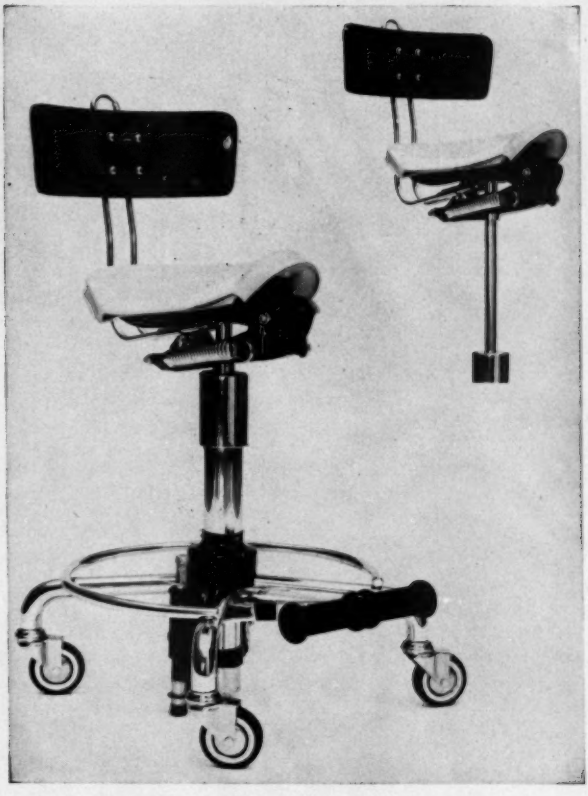

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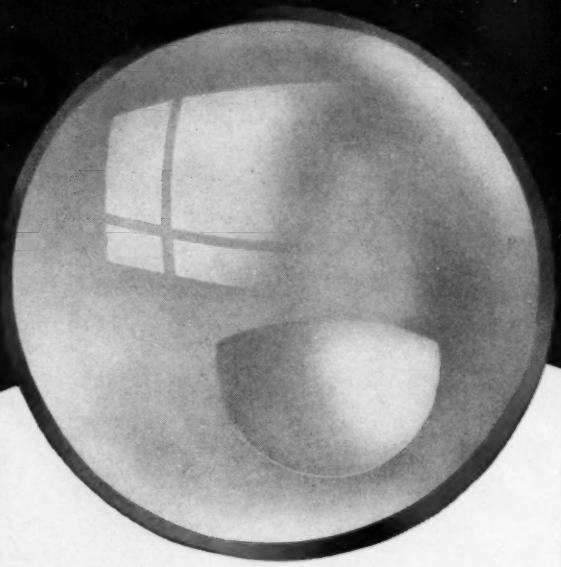

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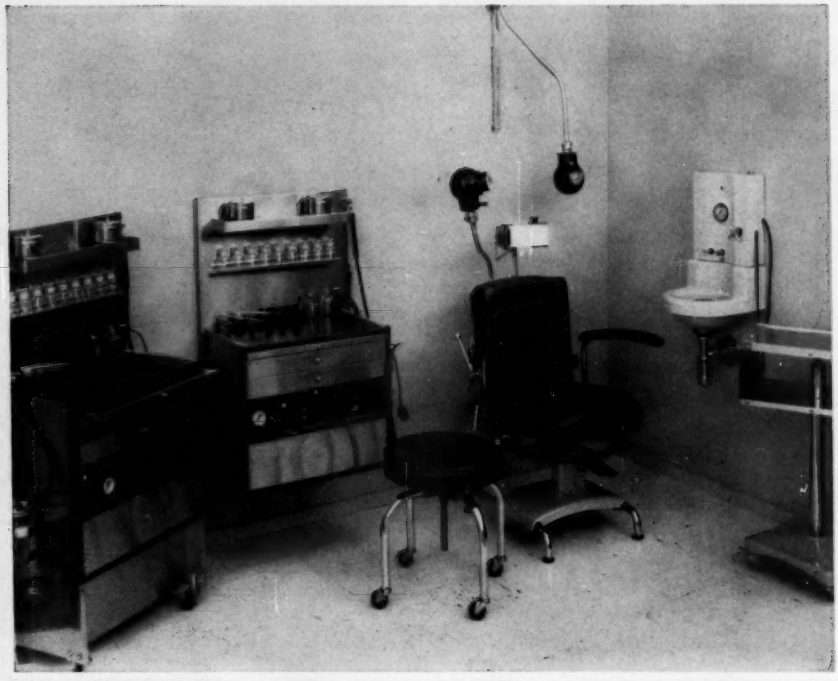

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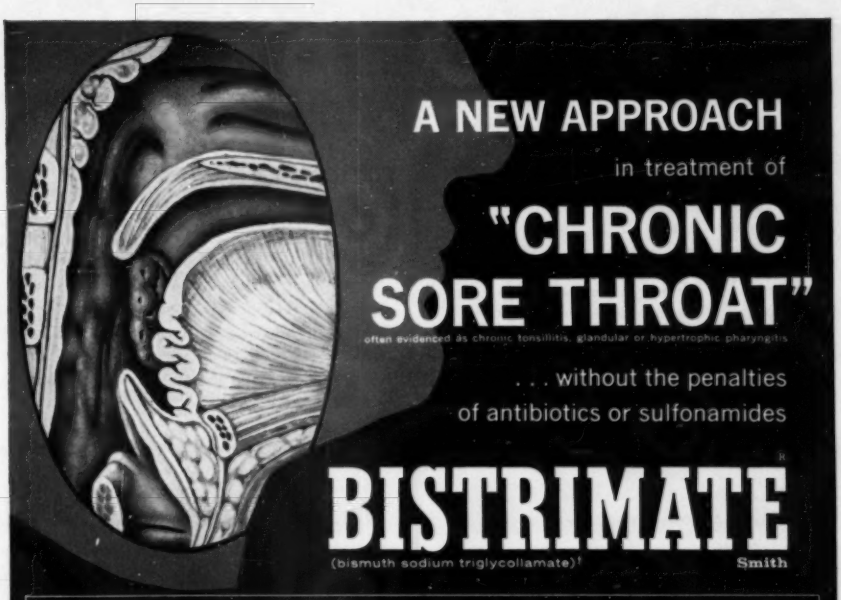

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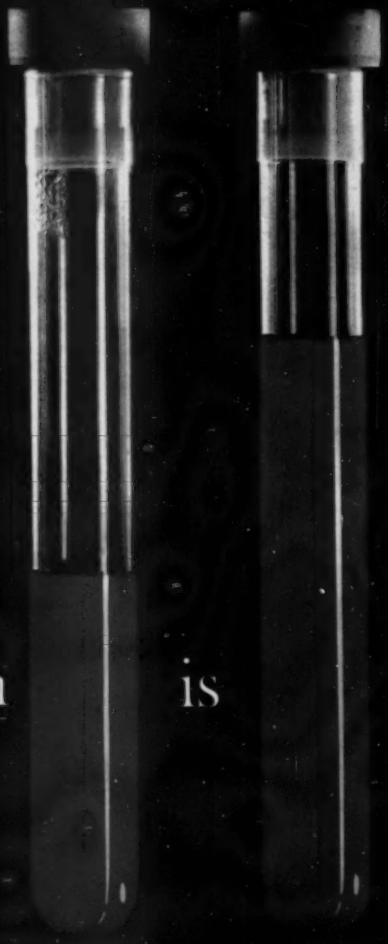

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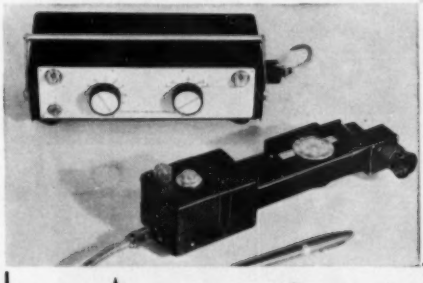

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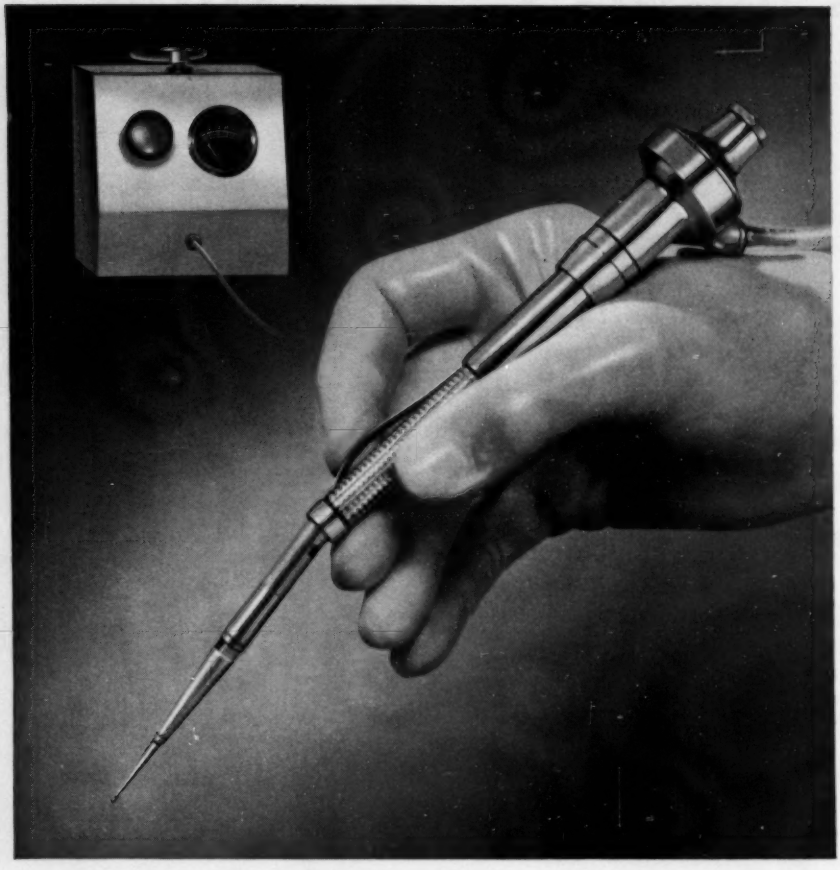

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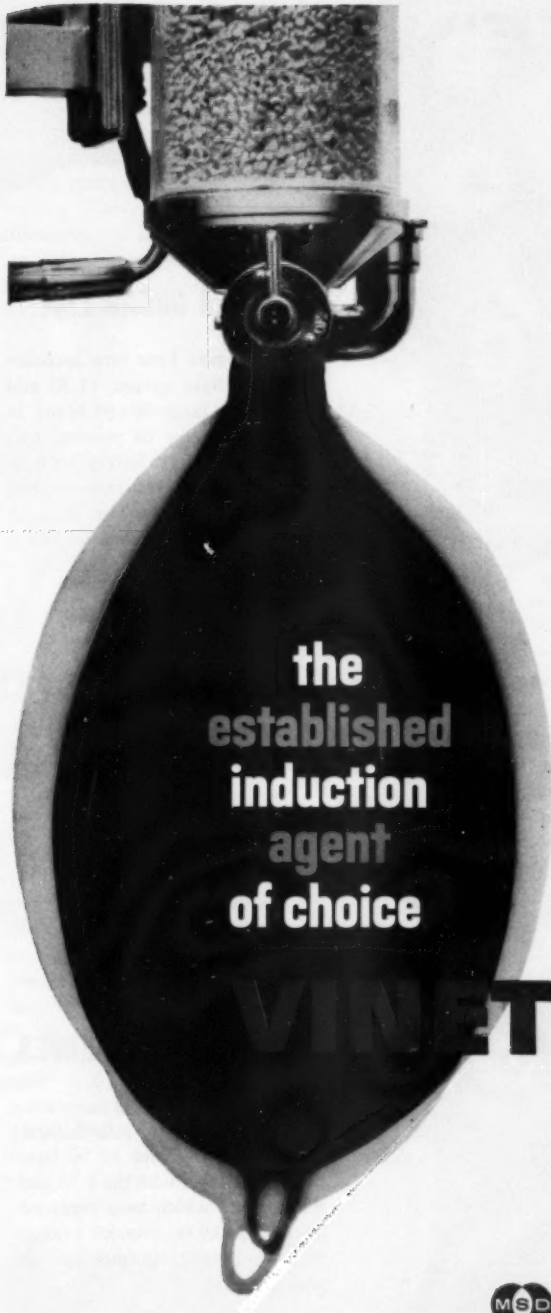

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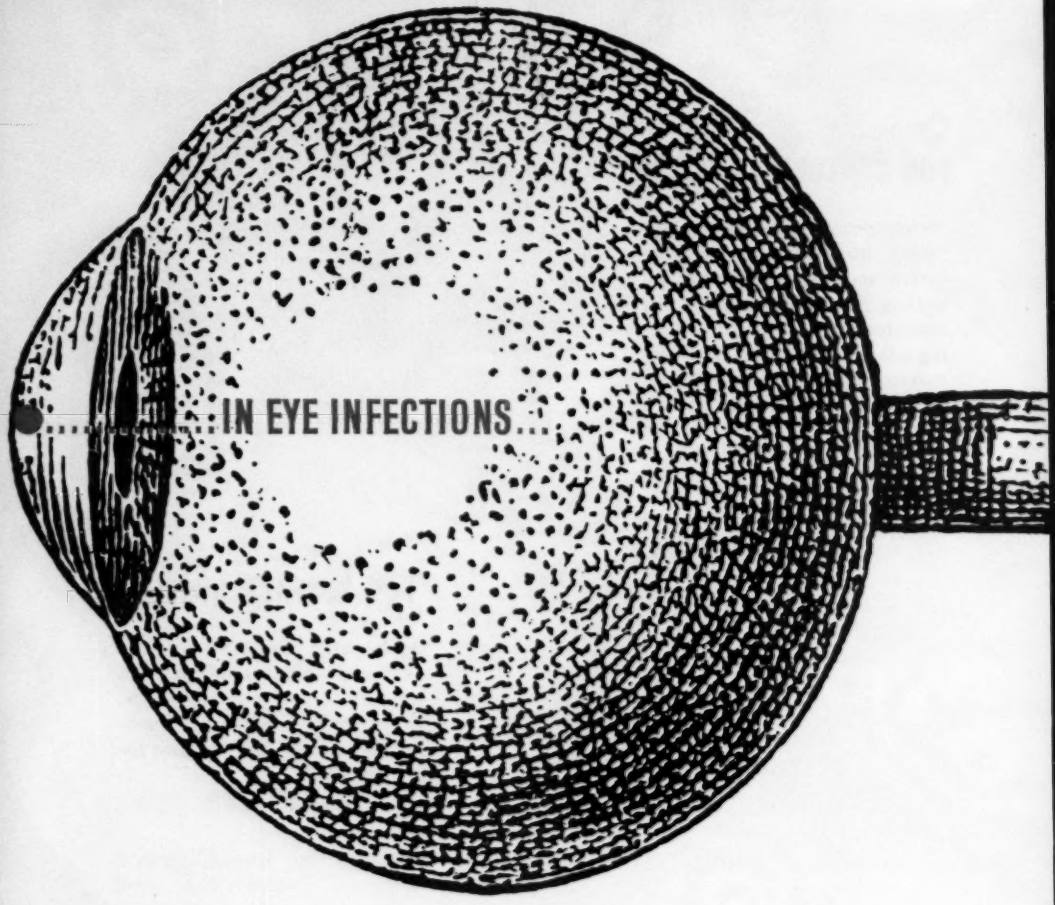

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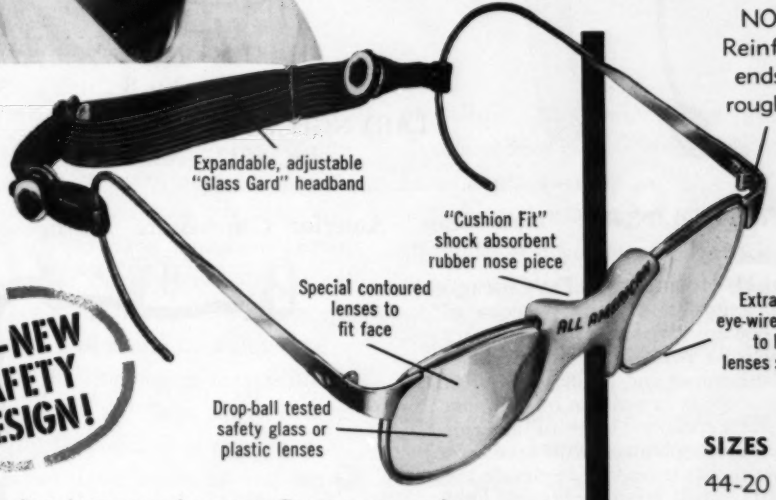
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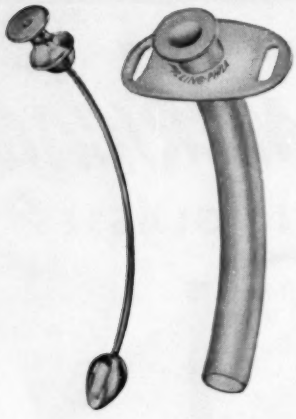

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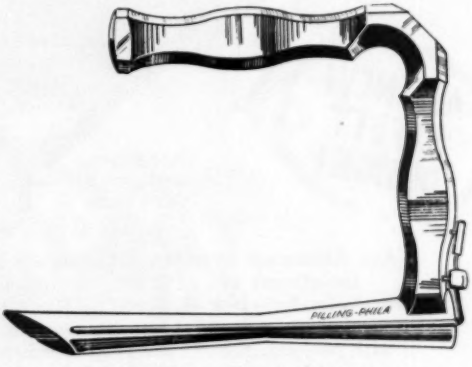

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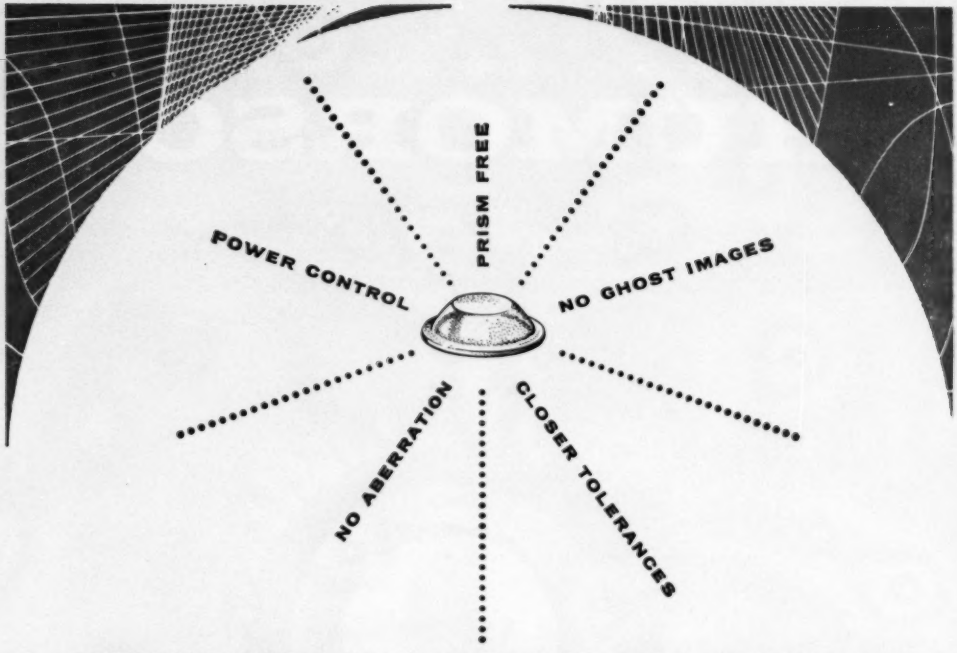

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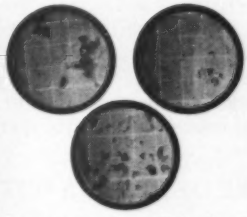

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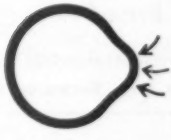

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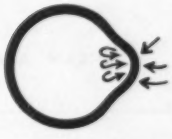

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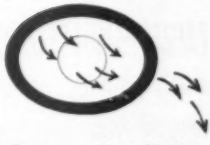

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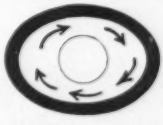

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* * *

I

INTRODUCTION

R. Townley Paton, M.D.
NEW YORK, NEW YORK

You will remember that we held our first symposium on corneal transplantation at the forty-second annual meeting of this society, when Alan C. Woods of Baltimore was President. I am glad to say that all the participants of that symposium are present today, some of them taking an active part and others as listeners.

It is my honor and privilege to act as moderator of this, our second symposium. It seems to me that the most practical introduction would be to review briefly the first symposium and point out the progress we have made since that time—1948. Undoubtedly still further changes in views will be recorded when we hold a third symposium some years from now.

The first paper in 1948 was my own presentation of the problems of selection of cases, based on a rather crude classification which many others have improved since (table I). Probably the most striking change is the addition of a classification on therapeutic keratoplasty, a subject which one of our panelists will present on the basis of authoritative experience. As an example of this change, I stated formerly that most cases of dystrophy were unfavorable to corneal transplantation, and Owens and his collaborators in an analysis of 417 eye operations included only ten cases of Fuchs' dystrophy, without one successful outcome. Today the average of success in these cases is about 65 per cent, and some cases have been reported with good results after two previous failures. I have myself one such case which I have followed for five years. Moreover, fairly comparable improvement has occurred in nearly all other types of dystrophy. Today I should revise Owens' older table; the new table gives you some idea of the improvement that has been made in this field (table II).

Table I

Classification of Cases for Keratoplasty, 1947

1. Favorable for Improvement of Vision
2. Partially Favorable for Improvement of Vision
3. Unfavorable for Improvement of Vision
4. For Cosmetic Purposes
5. For Treatment of Descemetocele
6. When Preliminary Operation of Treatment is Necessary before Final Opinion Can Be Given

Presented at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

TABLE II

PERCENTAGE OF SUCCESSFUL RESULTS AFTER KERATOPLASTY FOR PROGRESSIVE CONDITIONS

	1959	1947
Conical Cornea	85-90	65.2
Hereditary Dystrophy	75	58.8
Fuchs' Dystrophy	65	0.0
Luetic Interstitial Keratitis (Inactive with minimal vascularization)	75	49.0

Other types cannot be included, since we do not have the essential information on the degree and extent of the scar, the amount of vascularization, or the size of vessels which may be present. In such borderline cases the statement made twelve years ago still holds: judgment in each case depends on experience. We still have no clear criteria for deciding for or against operation; we cannot be certain, for example, whether one small vessel will spoil the transparency of the graft in an otherwise favorable case, or whether the graft will remain clear because the cut vessel does not grow back into the graft area or is inhibited in its power of regeneration. This is only one of the still unsolved problems which will be brought out later in this symposium.

In summarizing the progress in recent years, we can say that much of the hesitancy in undertaking keratoplasty has vanished. At the last meeting, for example, one of today's panelists at his own expense presented twenty patients in person in order to dispel skepticism on the wisdom and value of keratoplasty. Today neither he nor any other ophthalmologist would consider such a demonstration necessary.

This change is especially conspicuous in the attitude toward early operation in many progressive conditions such as keratoconus and the dystrophies, including guttate keratitis; the latter may be a forerunner of Fuchs' dystrophy, though the connection has not as yet been histologically proved. This trend to early operation is in itself a tremendous forward step.

Improvements and refinements in techniques and in our understanding of their use have also contributed to progress in the last decade, though the fundamental procedures and instruments had largely been developed by the time of the first symposium. These advances will be covered fully by one of our speakers today.

In summary, we might say that the greatest advance over this period has been in therapeutic keratoplasty, which offered little hope in 1948. As we look forward into the future, our greatest advances during the next years will undoubtedly be in the fields of physiopathology and histology, and in a better understanding of the immune reactions between the donor and host. As a result of such progress, the time may come when total keratoplasty can be performed in blinded persons with at least some hope of success.

II

BIOLOGICAL RESPONSES TO CORNEAL HOMOGRAFTS

A. EDWARD MAUMENEE, M.D.
BALTIMORE, MARYLAND

THERE have been a number of advances in our knowledge of the biological responses to corneal homografts since the Symposium on Corneal Transplantation in 1947. Some of these findings will be discussed under the following headings:

I. Donor Material
   A. Fresh corneas
   B. Preserved corneas
      1. Viable
      2. Dead
   C. Plastic material

II. Healing of the Donor-Recipient Wound

III. Fate of the Elements of the Graft

IV. Causes of Opacification of the Graft
   A. Immediate clouding (one day to three weeks)
   B. Delayed opacification (three weeks to years)

DONOR MATERIAL

Fresh Corneas

It is generally accepted that fresh corneas are the most satisfactory material for penetrating corneal grafts. Donor eyes may be obtained either from enucleation or from cadavers.

Eyes with melanomas or metastatic tumors of the choroid are satisfactory for transplantation if there is not an accompanying anterior uveitis from degeneration of the tumor. Eyes with retinoblastomas and tumors of the iris are usually considered unfavorable. Eyes blinded from glaucoma or retinal detachment may be used if the endothelium of the cornea is normal. Conjunctival discharge, corneal ulcers, old corneal scars, Fuchs' endothelial dystrophy and anterior uveitis are usually considered reasons for rejection of the donor material. Fetal corneas and eyes of children less than five years of age are usually considered unsatisfactory. Senility is not a contraindication if the donor eye does not contain a number of cornea guttata.

The time between the death of the patient and enucleation should not exceed seven hours. The interval between enucleation and corneal transplantation should usually not exceed forty-eight hours. In general, it is better to use the corneas within twenty-four hours, for subsequent to this they begin to swell and soften. These changes will vary from eye to eye; therefore, it is not possible to state the exact age at which an eye should be discarded.

Aging of the cornea produces three factors detrimental to grafting: (1) the

The experimental work on which this presentation is based has been supported in part by funds from the National Council to Combat Blindness and from the Knights Templar Eye Foundation.

From the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital and University, Baltimore 5, Maryland.

Presented at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

endothelium undergoes progressive autolysis; (2) the donor material becomes edematous and thicker so that correct anterior-posterior apposition with the recipient cornea cannot be obtained; (3) the donor cornea becomes soft so that the sutures tend to pull through the graft.

All material should be handled with sterile technique. Cultures of the eyes may be taken, but in general the corneas are used before a report can be obtained on the results of the cultures. Therefore, since it is not possible to determine whether there are bacteria on the eyes before the corneas are used, it is wise to irrigate the globe with some antiseptic solution such as 1:1000 benzalkonium chloride (Zephiran) or 1:5000 methylate in normal saline solution. The eyes are kept in a moist sterile chamber but not in free fluid. They are refrigerated at plus 4° C.

The requirements for material to be used for lamellar transplantation are essentially the same as those stated above. The condition of the endothelium and changes in the anterior chamber are usually not a contraindication to the use of corneas for lamellar grafting. The duration of time following enucleation or death is also not as important a factor.

Preserved Corneas

The use of fresh donor material for corneal grafting is both inconvenient and wasteful. For many years, methods have been sought by which corneal tissue could be preserved and still remain useful for corneal transplantation. The clinical successes of Eastcott and his coworkers,[9] who reported in 1954 that lamellar grafts from donor material had been preserved in 15 per cent glycerol and frozen at minus 79° C. for up to nine months, renewed interest in this subject. Since then a number of studies have been made to determine the best method of storing corneal material.[5,6,19,20] Stocker[20] has pointed out that these methods fall into three general groups: (1) storage in liquid paraffin (mineral oil); (2) freezing after glycerol treatment, and (3) vacuum dehydration.

Corneas preserved with formalin fixation and by freezing are not suitable for penetrating corneal grafts because the grafts become excessively edematous during the postoperative period.[18] Recent studies have indicated that this edema is due to a destruction of the endothelial cells.[14,20] For this reason, it is important to determine the effects of various methods of storing on the endothelial cells. Stocker has approached the problem by studying the histological appearance of the cells and their growth in tissue culture after various methods of preservation. He found that when eyes were stored in a moist chamber at plus 4° C. for forty-eight hours, the endothelial cells developed marked vacuolization of the cytoplasm and nuclei. After four days, the cells showed extensive disintegration. When the tissue was stored in mineral oil at plus 4° C., the cells appeared as good at the end of four weeks as those in the moist chamber had at forty-eight hours. Corneas stored in mineral oil for five weeks showed evidence of cellular growth from the epithelial, stromal and endothelial layers when placed in tissue culture. After six weeks of storage, no growth occurred from any of these three layers. Thus, it appeared that preservation in mineral oil is superior to that in the moist chamber at plus 4° C.

Glycerol dehydration prior to freezing protects the tissue so that the epithelial, stromal and endothelial cells will grow in tissue culture after as long as nineteen weeks of preservation. It appears that the optimal concentration of glycerin for

dehydration is about 15 to 20 per cent. Most workers have preserved tissues at minus 79° C., but Stocker thinks the optimal temperature is minus 45° C.

In spite of the obviously successful attempts to maintain the viability of all three layers of the cornea when preserved in mineral oil or by dehydration in glycerin and freezing, there have been few cases in which successful penetrating corneal grafts have been obtained with this material. Such grafts usually become edematous during the first few postoperative weeks, and when clearing occurs, it takes place over a period of many months. This opacification is thought to be due to changes which occur in the donor endothelium during preservation. It is, therefore, apparent that evidence of viability of the endothelial layer is not a sensitive enough indicator of the physiological condition of this tissue to determine if a donor cornea is suitable for a penetrating transplant.

Nonviable Grafts

King[12] has devised a technique whereby corneas are dehydrated in 95 per cent glycerin and stored in a vacuum at room temperature. All workers who have investigated corneas prepared in this manner agree that they are not viable.[5,20] Such corneas are not suitable for penetrating corneal grafts but, interestingly enough, clear lamellar transplants have been obtained with this tissue in both experimental animals and man. These observations indicate that the stromal framework without cellular components is an adequate structure for rebuilding of the cornea. Epithelial cells and stromal cells from the recipient eye cover and invade this framework to produce a viable tissue.

King[11] states that when tissues preserved by his technique of dehydration are used, he has never observed a delayed opacification of a lamellar graft. If this observation can be confirmed by further studies, it will be a most significant one. It confirms previous observations that viable cells in a tissue are essential to elicit the homograft allergic reaction.[4] Further, and more important to ophthalmology, it demonstrates that the cornea can be altered sufficiently to eliminate the homograft reaction and still remain suitable as donor tissue.

The success of lamellar transplants with this nonviable tissue and the failure of penetrating grafts with the same type of material are additional evidence of the importance of the endothelial cells in penetrating corneal grafts.

Plastic Material

It has frequently been suggested that a clear substance, other than the cornea, might be used in corneal grafting. In recent years, the discovery of clear, inert, plastic material has revived the interest in this technique for replacing opaque corneal tissue. There are two factors, however, which at this time, at least, make it unlikely that such an operative technique will be successful. First, the body tends to repel any foreign substance, particularly if it is exposed to the surface. Second, any artificial break in the epithelial covering of the body allows bacteria to invade the tissue and produce a subsequent infection with destruction of tissue.

In summary, it appears that viable tissue with a healthy, intact endothelium is essential for successful penetrating corneal transplants. Preserved material that is either viable or nonviable may be used in lamellar grafts. Further studies are needed to determine whether viable cells are of benefit or are detrimental in donor corneas that are going to be used for lamellar grafts. The best method of preserving viable corneal tissue for periods of months is dehydration in 15 to 20 per cent glycerin and storage at

minus 45° C. Plastic buttons or other foreign substances are not satisfactory for the replacement of corneal tissue at the present time.

HEALING OF THE DONOR-RECIPIENT WOUND

Recent studies on the mechanism of closure and healing of corneal wounds have confirmed the observation reported at the Corneal Transplantation Symposium in 1947,[18] that is, when the tissue is brought into appropriate apposition, the opening is closed by swelling of the cornea. In the rabbit, a fibrin clot aids in the closure. Within the first few days the epithelium covers the anterior junction of these tissues, and the endothelium the posterior surface. Corneal stromal cells are converted into macrophages, and similar cells from outside the cornea invade the wound. These cells later become fixed tissue histocytes and produce collagen fibers which seal the wound. The strength and rapidity with which this wound is closed depend on many factors. One of the most important is the close approximation of the donor and recipient tissues. The endothelial cells become converted into fibroblast-like cells and usually produce several layers of collagen fibers on the surface of the adjacent donor and recipient Descemet's membrane.

The extensive studies of Dunnington and Weimar[8] and Dunnington and Smelser[7] have uncovered a most important fact. They found that if the epithelium is removed daily in the area of a stromal incision, the macrophages or fibroblasts in the stroma will accumulate in the normal manner, but these cells do not differentiate into fibroblasts for as long as four days after injury. This interesting observation adds further evidence to the suggestion that the epithelial and stromal cells of the cornea exist together in constructive symbiosis.[10]

The dependence of fibroblastic maturation on the presence of surface epithelial cells may have a practical application in corneal transplantations. Wound healing may be impaired by such devices as contact lenses or plates that are used to splint the graft, for unless these structures fit loosely and allow a free flow of tears beneath them, they probably damage the epithelial cells.

FATE OF THE ELEMENTS OF THE GRAFT

It has been previously stated that the donor epithelium is replaced by migration of epithelium from the recipient cornea. The endothelium probably survives for at least a few days, but direct evidence for this suggestion is not available. The stromal cells survive and do not show evidence of massive degeneration or replacement at any one time during the postoperative course. However, it is thought that these latter cells are probably gradually replaced by keratoblast from the recipient cornea. The stromal framework of the donor material is not replaced.[18]

It has not been possible to determine, with certainty, the fate of the corneal stromal cells in the graft, for if these cells are tagged with any foreign material, it is possible that they could die and be phagocytized by the invading macrophages from the recipient. If this occurred, the new cells would contain the identifying substance and it would be impossible to distinguish the donor from the recipient cells.

A recent very interesting observation by Basu and Ormsby[3] offers a possible solution to this problem. In 1949, Barr and Bertram[2] discovered that the female sex chromosome could be observed at the margin of the nucleus in approximately 30 to 80 per cent of certain cells in the body. This made it possible to determine the sex of an individual from

the histologic examination of a bit of tissue.

In histologic preparations of corneal stroma, the keratocytes are so compressed between the lamellar fibers that it is not possible to observe the sex chromosomes at the margin of the nucleus. Basu and Ormsby found, however, that if the stromal cells were grown in tissue culture, the female sex chromosome could be recognized easily in fixed preparations. They have stated in a preliminary report that when the cornea from a female donor was transplanted to a male recipient, the female sex chromosome could be observed in the donor tissue for at least three months following transplantation. The use of this technique to determine the origin of stromal cells in a graft will eventually settle the question of survival of the corneal stromal cells in a homograft.

CAUSES OF OPACIFICATION OF THE HOMOGRAFT

Immediate Clouding

The usual causes of opacification of corneal grafts within three weeks after operation are technical in nature and can be prevented with adequate precautions. The first of these is poor donor material. Corneas from stillborn fetuses and young children are not satisfactory because the curvature of such corneas differs slightly from that of an adult cornea, and because the fetal tissue is considerably softer than the adult. It has been stated that all preserved donor material is unsuitable for penetrating keratoplasty because the endothelial cells are damaged in the process of preservation. The importance of the endothelium can be demonstrated by scraping these cells off of fresh donor material. A clear corneal transplant may be obtained by such a graft, but the donor tissue will remain edematous for a long time and in most instances will remain permanently opaque. Endothelial changes are one of the most important reasons why fresh material must be used before it is forty-eight hours old.

Poor apposition of the wound edges allows aqueous to seep into the corneal stroma and cause an opacification of the graft during the immediate postoperative period. Some of the factors which produce this type of defect are ragged or uneven wound edges, a discrepancy in the thickness of the donor and recipient tissue, incorrect apposition of the lips of the wound by inadequate suturing, and foreign material in the wound—for example, lens, vitreous or iris. These complications will be discussed by another member of this symposium.

There are two other obvious causes of immediate opacification of the graft. One of these is infection. This may arise from the donor or recipient or may occur during the postoperative period due to a conjunctival infection or stitch abscess. Many eyes that are grafted have abnormalities of the conjunctiva as well as the cornea; therefore, one should always give these patients prophylactic antibiotic therapy prior to corneal transplantation.

An obvious, but distressing, cause of opacification of the graft is a traumatic displacement of the tissue, either by the patient or by the physician.

DELAYED OPACIFICATION

The Homograft Reaction

The most important single cause of delayed opacification of the graft, in an eye that has been properly selected for corneal transplantation, is the homograft allergic reaction. In penetrating transplants this may occur from three weeks to at least two years after transplantation. When the reaction occurs as early

as three weeks after operation, the recipient cornea is usually heavily vascularized and the graft is frequently edematous from one of the above-mentioned immediate causes during the early postoperative period. It is, therefore, sometimes difficult to determine exactly when the homograft reaction takes place.

If the transplant has been successful and the graft is clear after operation, the onset of the homograft reaction is usually easy to detect. The patient's first symptoms are a feeling of irritation of the eye and a slight clouding of vision. Occasionally, he will observe halos. Externally, the eye usually shows a mild circumcorneal flush of the blood vessels.

On slit lamp examination, the posterior layers of the stroma will appear edematous, the aqueous ray will be slightly positive, and a few keratic deposits may be present on the posterior surface of the graft. If the recipient cornea is clear enough that the endothelial surface can be observed, it will be noted that the changes are confined to the graft. As the reaction continues, the stroma becomes progressively more edematous. Eventually the graft may become quite thickened and blood vessels will grow into the transplant. The severity of the reaction is usually inversely proportional to the length of time the transplant has been clear. Thus, if it occurs many months to years after transplantation, the reaction may be mild and may clear spontaneously.

Evidence that this reaction is a homograft response may be summarized as follows:

1. The response is localized to the graft.
2. It occurs much more frequently in heavily vascularized than in avascular corneas.
3. Experimentally, a similar clouding can be produced in corneal grafts of rabbits by increasing the dose of the homograft antigen by transplanting skin from the same donor to the recipient.
4. Corneal stroma and endothelium are capable of illiciting the homograft reaction.[4a]
5. Penetrating autografts of the entire cornea in man do not develop a delayed opacification.[15]

A brief explanation of the latter two pieces of evidence might be in order. It has been stated that the mucopolysaccharides of the corneal stroma prevent the tissue from eliciting the homograft reaction.[1] To test this assumption, one eye of a recipient rabbit was used as an autograft, and an eye from another rabbit as the donor homograft. The epithelium was carefully removed from both eyes and the corneas were divided into three parts. These bits of cornea were placed in the subcutaneous tissue of the abdominal wall of the recipient. Pairs of autografted and homografted corneas were removed on the sixteenth, twenty-eighth, and forty-second days. The autografts and homografts were indistinguishable on the sixteenth day. The stromal cells appeared normal and neither tissue had elicited an inflammatory reaction. By the twenty-eighth day there was evidence of stromal cell destruction and a definite round cell inflammatory reaction in and about the homograft. On the forty-second day the inflammatory reaction to the homograft had almost subsided and the graft was almost completely devoid of keratocytes. The autografts on the twenty-eighth and forty-second days had produced no inflammatory reaction and the stromal cells were as well preserved as in the specimen removed on the sixteenth day.

The second eye of the recipient and of the donor were used as a second set of autografts and homografts. These speci-

mens were removed on the seventh, fourteenth, and twenty-first days after implantation. Again the autografts caused no more reaction than did the first set of transplants. The homografts, on the other hand, produced a slight reaction by the seventh day, and a marked response by the fourteenth day.

These experiments demonstrated that the corneal stromal cells and the endothelium are capable of eliciting and responding to the homograft reaction. Evidence that this response is not related to an organ-specific type of sensitivity to corneal proteins is the lack of reaction to the autograft.

The observation that penetrating autografts of the entire cornea do not develop a delayed opacification supports the theory that delayed clouding of homografts is due to the donor-recipient reaction for the following reasons. Total penetrating homografts may take and remain clear for periods of up to eighteen months. Twelve such grafts have been performed at the Wilmer Ophthalmological Institute and all but one became totally opaque by the fifth postoperative month. The one graft that survived the five-month period became semi-opaque by the eighteenth month. The sequence of opacification in these grafts is similar to that of other penetrating grafts in vascularized corneas but the response is more violent.

In contrast to the unfavorable response of the total homografts, five total autografts have remained completely clear for as long as they have been followed (up to three and one-half years).[15] One other total autograft is of interest. This graft was not successful because the iris became included in the posterior part of the wound and the vitreous adhered to the endothelium. In spite of the corneal edema that resulted from these complications, parts of the cornea remained clear. At no time did the eye develop a reaction similar to that seen in the homograft response, even though the graft became partially vascularized.

Evidence that the homograft reaction produces an opacification of lamellar transplants is not as convincing. To date, it has not been possible to produce this type of response experimentally.[13] However, since it has been shown that homografted stroma and endothelium can produce and elicit this response when placed in a vascularized area, it is reasonable to assume that a lamellar graft, when placed in a heavily vascularized cornea, will produce this response. Clinically, clear lamellar grafts have been observed to become opaque three to six months after grafting. I believe that this is probably due to the homograft reaction.

It has been suggested that blood groupings and tissue-specific antigens to corneal protein may cause delayed opacification of a penetrating corneal transplant. There is little evidence to support these suggestions, and many observations tend to disprove them.[16]

Diseases of the Host

A number of other factors which may cause a delayed opacification of the graft may be grouped under diseases of the host cornea. These are endothelial dystrophy, a total opacification of the recipient cornea, keratinization of the recipient corneal and conjunctival epithelium, and stromal herpes.

It is thought that an endothelial dystrophy of the recipient produces an opacification of the donor tissue either by direct invasion of the donor tissue by edema from the recipient or by a replacement of the endothelial cells of the donor by those from the recipient.

The cause of opacification of the graft in a totally opaque cornea is not well understood. It is possible that the endo-

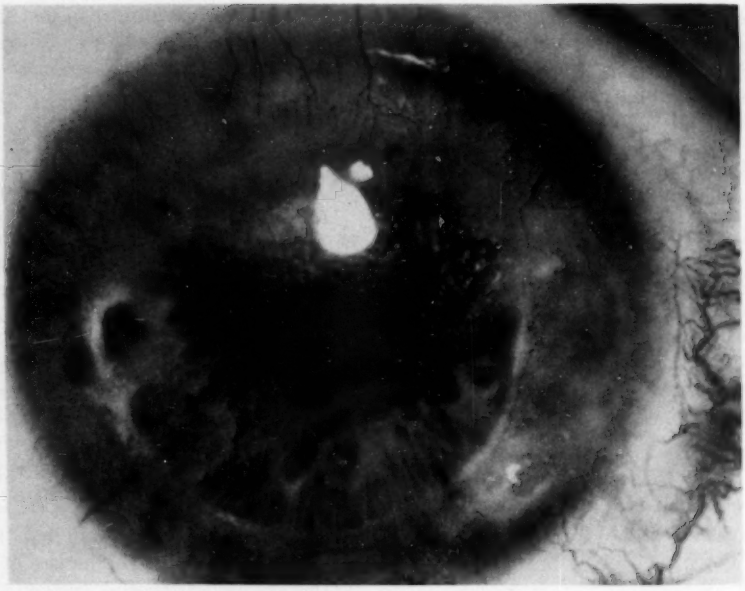

FIG. 1—(M.A. 1958) Early crystallin-like deposits (lipid?) at the donor-recipient interface.

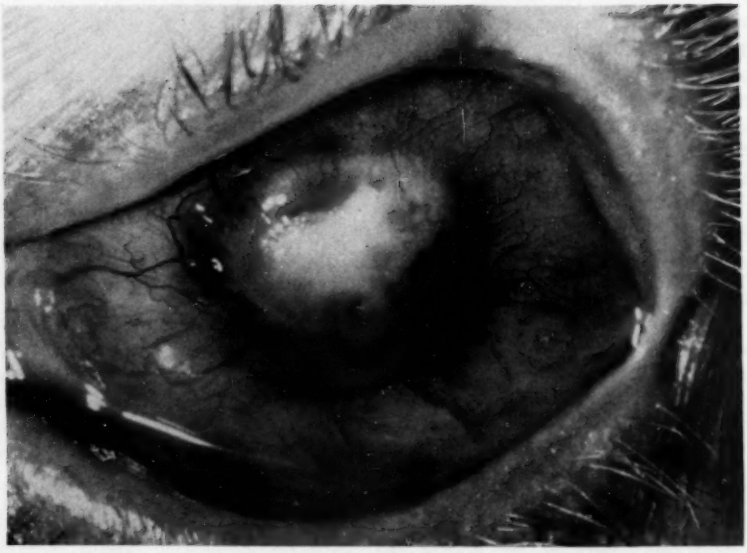

FIG. 2—(D.R. 1957) Advanced crystallin-like deposits at the donor-recipient interface three years after graft.

thelial cells of such a recipient cornea do not function normally and as they replace the cells on the back of the graft, the tissue becomes edematous. Another mechanism which is purely speculative is that the surrounding opaque recipient cornea does not have the proper chemical constituents to produce transparency, and over a period of time the donor cornea gradually loses its normal chemical components and is replaced by those from the recipient.

The factors which cause opacification when the epithelium is keratinized are likewise poorly understood. It is possible that the observation of Dunnington and Weimar,[8] and also that of Dunnington and Smelser,[7] that normal corneal epithelium is essential for normal corneal stromal cells, may have some bearing on this problem.

The factors which produce opacification of the cornea in stromal herpes are equally mysterious. It is a clinical observation, however, that if a graft is so placed that the stromal changes from herpes remain in the recipient cornea around the graft, the transplant may eventually become involved by this same process. A graft placed on an eye with a Mooren's ulcer may also become involved in this same process even though the entire ulcerated area has been replaced by a transplant.

Fortunately, lamellar transplants can be used successfully in many instances when penetrating grafts would fail. However, there is one distressing complication which occurs following lamellar transplantation that does not occur in the penetrating graft. This is the late accumulation of crystallin deposits at the donor-recipient interface where the deep blood vessels in the recipient cornea cannot be removed at the time of operation (figs. 1 and 2). The chemical nature of these deposits has not been determined histochemically. Their clinical appearance, however, is very similar to those which occasionally occur in the old vascularized lesions of the cornea. These later lesions have been shown to be lipid infiltrations.

CONCLUSIONS

Many advances have been made in our knowledge of the biological responses to corneal homografts since our last symposium in 1947. Valuable techniques have been devised for studying these processes. It may be hoped that when a symposium is held on this subject ten years from now, many of the unknown problems mentioned in this presentation will have been solved.

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III

INSTRUMENTATION AND TECHNIQUES OF KERATOPLASTY

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THERE has been a plethora of literature on corneal transplantation since the last symposium on this subject held in Chicago twelve years ago at the Fifty-Second Annual Meeting of the American Academy of Ophthalmology and Otolaryngology.[21] In the short time allotted me I cannot possibly enumerate even a fraction of the many valuable contributions made to this phase of ocular surgery during this relatively short period of time. Fortunately, since 1947 several excellent books on keratoplasty have been published, all with very complete descriptions of the instruments and techniques. Among them I should like to mention, in chronological order, *Les Greffes de la Cornée* by Paufique, Sourdille and Offret,[22] *Keratoplasty* by Paton,[20] *The Cornea* by Thomas,[28] and *Corneal Grafts* by Rycroft.[25] In addition, several texts on general ophthalmic surgery contain comprehensive chapters on corneal transplantation. These include Arruga's *Ocular Surgery*,[1] Stallard's *Eye Surgery*,[26] and others. Those interested in a more detailed study of instrumentation and techniques are referred to these books. I shall deal only with a few highlights of the advances made since the last symposium.

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In his presentation on techniques at the 1947 symposium, McLean[19] pointed out that a review of the literature showed the various surgical procedures which were being considered at that time were total keratoplasty, rotating autokeratoplasty, superficial lamellar keratoplasty and partial penetrating keratoplasty. He said that for general use the last was by far the most popular and had the widest application. He found that total keratoplasty had had sufficient trial in animal experiments and human cases to be discarded and that it was not successful in practical application nor feasible on theoretical grounds.

According to McLean's analysis in 1947:

> Rotating autokeratoplasty, while theoretically sound, does not work well in practice. . . .
>
> Superficial lamellar keratoplasty is theoretically feasible but very little used in this country. Since it is a form of nonpenetrating keratoplasty there must be an area of wound union all the way across the base of the graft with some attendant scarring. For most surface scars keratectomy is simpler and just as effective. However, in certain cases of deeper scarring where any form of penetrating keratoplasty seems to introduce excess risk, it must be considered. An example of this would be a case of aphakia with bulging vitreous. Here the risk of vitreous loss and vitreous incarceration at the edges of the graft might outweigh the better visual prospects of an uneventful penerating graft and militate in favor of the safer, if visually poorer, nonpenetrating graft.

The partial penetrating corneal graft is the most successful method in ordinary cases.

In 1947 the small graft was favored, but a gradual swing toward larger and larger grafts with greater visual success was already under way. McLean pointed out, however, that the graft should not be so large as to interfere with the angle of the anterior chamber or to allow iris incarceration or prolapse at the edges.

An overlying suture was used for fixation of the graft. It was either continuous or consisted of two crossed sutures fixed in the cornea of the host near the graft. This method was preferred to direct suturing of the graft to the recipient cornea, which seemed to further unnecessary trauma to the graft. Therefore, direct suturing was avoided in ordinary cases and used only under special conditions. Omission of sutures and the use of other devices for fixation of the graft at that time had usually proved unsuccessful. Equivalent results were obtained with the two most popular shapes then in use, the round and the square graft. For preparation of the graft, the hand trephine was preferred to the high-speed trephine, which involved greater risk of injuring the lens. The pupil was dilated at the end of the operation to avoid synechias and incarceration of the iris. All donor material had to be corneal tissue. Attempts made to use buttons of glass, plastic and other tissues had all been unsuccessful. The donor material best suited to corneal transplantation was obtained from a freshly enucleated eye or one satisfactorily preserved. The New York Eye Bank, recently organized, facilitated the collection and distribution of donor material previously difficult for the individual surgeon and small hospitals to obtain.

The percentage of success depended on the suitability of the cases selected for keratoplasty. A fair number of successful grafts could be expected only in favorable and moderately favorable eyes. Many patients, classified as not suitable for successful corneal transplantation, were dismissed completely.

Using the quoted conclusions reached at the last symposium on corneal transplantation held by the Academy in 1947 as a comparison, I shall now discuss briefly a few of the highlights of the present status of techniques and instrumentation to emphasize the tremendous changes that have taken place and the progress made in the short span of twelve years in this highly specialized field of ocular surgery.

FIXATION OF THE GRAFT

Direct suturing of the graft to the recipient cornea was recommended only in cases of aphakia to prevent dislocation of the graft by vitreous prolapse, or in infants and unruly adults when a stormy postoperative course was anticipated. Although it was obvious that marginal sutures constituted the ideal method of holding the graft in position, the systematic use of this technique was possible only with very sharp needles to minimize trauma to both the graft and the host cornea. Unfortunately such needles were not then available, so marginal fixation of the graft was limited to the special cases already mentioned.

In keratoplasty the needle should be considered one of the most delicate instruments, essential to a smooth performance of the operation with a minimum of trauma to both the graft and the host cornea. When needles with very fine points, highly polished and with sharp edges, became readily available (the Vogt-Barraquer[2] triangular cross section no. 81 and the Castroviejo[10] flat cross section no. 82 manufactured by

Greishaber, and similar needles made later by other firms), it was possible to fix the graft routinely to the host cornea by direct suturing, and this method of fixing the graft was almost universally accepted. Greishaber needles 81 and 82 are available in three sizes: 5, 7 and 10 mm. The 7 mm. size is most widely used for keratoplasty, although some surgeons prefer the smaller one (5 mm.) or even the new 4 mm. needle (no. 83) designed by José I. Barraquer and manufactured by Greishaber.

Until recently most surgeons used 6-0 silk, but the tendency today is toward finer suturing material and the use of 7-0 silk. In the search for still finer sutures less traumatic to the ocular tissue, Barraquer advocated the use of raw silk, which he gauged at 12-0 but which is 8-0 according to American standards. The great advantage of this fine silk is that it may be left in the eye for three weeks or longer, causing little irritation. Its tensile strength, however, is low and it bleaches shortly after application. A staining solution, such as fluorescein or methylene blue, must be used to visualize the stitches for removal.

During the past year Ethicon has developed a new atraumatic needle of 0.008-inch wire with 7-0 braided silk. This fine silk has practically all the advantages of raw silk but its tensile strength is greater. It is easier to handle, does not bleach and is well tolerated by the eye for three weeks or longer. Although the Ethicon needle is not as sharp as those manufactured by Greishaber, it is thinner, quite adequate, and the least traumatic of all the needles presently available. The point and cutting edges of this needle have been made in such a way that it will penetrate tough corneal tissue but will not cut out in any direction. It is to be hoped that when this needle becomes available for general use, it will have the same good qualities as those submitted to ophthalmic surgeons throughout the United States during its trial stage. Several ophthalmic surgeons have developed needle holders to be used with these delicate needles. Some prefer a needle holder without a catch; others prefer a catch to minimize finger tension.

In addition to the fine needles and the comparatively fine needle holders, delicate suturing forceps are necessary to hold fractions of the thickness of the corneal tissue. A number of surgeons have designed several models of these forceps in varying shapes and sizes to meet their personal requirements. The combination of a fine needle, a fine and smoothly working needle holder and a delicate fixation and suturing forceps has become essential for the performance of a keratoplasty, particularly for marginal suturing of the graft.

The operative field should be sufficiently magnified to ensure accurate performance of these precise surgical procedures. Some surgeons prefer fairly high magnification, using binocular microscopes similar to those used by otolaryngologists for fenestration operations. Others find this high degree of magnification not only nonessential for corneal surgery but even undesirable, as it hampers maneuverability. Binocular magnifying loupes, some self-illuminating, are now available with magnification up to five times. This is ample for corneal surgery and the loupes, attached either to ordinary frames or to a headband, allow more flexibility of movement than is possible with the microscopes. Good illumination of the operative field is essential in corneal surgery. This remark may seem unnecessary, as it is taken for granted that the ophthalmic surgeon always uses adequate lighting, but unfortunately this often is not the case. The light for corneal surgery must not be diffused; it must be concentrated, with fairly high intensity, within the

palpebral fissure and particularly on the cornea. A light that can be moved by the surgeon and directed to the desired area to give the right angle of illumination at all times is preferable.

Catgut has been used instead of silk so the stitches would not have to be removed, but it proved unsatisfactory as it tends to promote haziness of the graft, vascularization and even corneal abscesses. In addition, it occasionally remains unabsorbed for over three weeks and the stitches must then be removed to prevent the complications mentioned. Cotton and a variety of plastics have been found inferior to fine silk. Other methods of holding the graft in position, such as fibrin and splints, have not proved as effective as direct suturing and their use has been very limited.

Some surgeons advocate the use of razor-blade knives for the removal of the sutures, about twenty-one days after the operation in penetrating grafts and about two weeks in lamellar ones. I prefer sharp-pointed Wescott scissors and sharp-pointed jeweler's forceps for the removal of sutures, using akinesia of the orbicularis to prevent squinting in adults, and general anesthesia in children and unruly patients.

TECHNIQUES AND INDICATIONS

In this symposium I shall discuss only four techniques for keratoplasty: (1) lamellar: (a) partial central, (b) peripheral, and (c) total; (2) penetrating: (a) partial and (b) total; (3) combined lamellar and penetrating (the mushroom graft); and (4) keratoprosthesis. Because of their limited application, techniques other than those mentioned will not be discussed in this brief presentation, as a detailed description of these different types of procedures for keratoplasty may be found in books and articles on the subject.

Lamellar Keratoplasty

The French school of ophthalmology, through the pioneering work of Magitot and Mórax, followed by Paufique, Sourdille and Offret, is responsible for the revival of this type of keratoplasty, a most valuable addition to this field of corneal surgery.

Indications for lamellar keratoplasty are many. The results obtained may be excellent when the indications are well established. The principal ones are restoration or improvement of vision; reconstruction as a preliminary operation to improve the cornea structurally and prepare it for a final keratoplasty for optical purposes; therapy and cosmetic purposes. The indication for lamellar keratoplasty for optical purposes is the treatment of opacities that do not involve the entire corneal thickness. It is most effective when the opacity is fairly superficial and may be completely removed by lamellar dissection.

In unruly patients and children, when a stormy postoperative recovery is to be expected, lamellar keratoplasty is preferable to the penetrating type unless the opacity involves the full thickness of the cornea. In aphakic eyes, a penetrating keratoplasty offers the risk of incarceration of the vitreous in the edge of the incision with subsequent cloudiness or opacification of the graft, and a lamellar transplant should be the operation of choice provided the corneal opacity does not involve all the corneal layers.

The lamellar graft should be used whenever possible, as it is less likely to cause severe complications in patients with only one useful eye. Some corneal dystrophies respond well to lamellar keratoplasty. In general, lamellar keratoplasties should be attempted for visual purposes whenever the opacity is likely to be completely removed by lamellar

dissection of the outer layers of the cornea. If at the time of the operation the opacity is found to be deeper than anticipated and the bed of the host cornea is still too cloudy to warrant a good visual result with a lamellar graft, a penetrating keratoplasty should be performed instead. A lamellar graft should be performed first in cases of dense superficial vascularization as observed after burns. In such cases, if the transplant remains fairly clear and there is sufficient improvement of vision, no further surgery will be required. However, if the transplant should become cloudy, the cornea (structurally improved but with no vascularization) should be in better condition for a final penetrating keratoplasty performed for visual purposes.

Recurrent herpetic keratitis offers a good indication for lamellar keratoplasty. Paufique, following the ideas first advocated by Filatov, found lamellar keratoplasty useful as a therapeutic measure to improve affected corneal tissue surrounding the graft. Lamellar peripheral keratoplasty has been advocated for the treatment of recurrent pterygium, but alone, without beta irradiation, it may not prevent recurrence. Keratectomy with beta irradiation is to be preferred for this purpose unless the cornea is very thin and the danger of perforation necessitates structural improvement of the cornea by a lamellar graft.

A total lamellar graft has proved useful in advanced cases of Fuchs' dystrophy with pronounced epithelial blister formation extending over the entire corneal surface, accompanied by great discomfort, not to improve the eye functionally but rather to arrest or diminish the epithelial edema and thus render the eye more comfortable.

Lamellar keratoplasty, in the shape of a ring of corneal tissue with a central opening, has been used to cover the ulcerated area in some cases of Mooren's ulcer, preserving the central portion of healthy corneal tissue of the host. However, this method is more complicated than a total lamellar graft, which yields similar, if not better, results.

Free-hand dissection, with scarifiers, special corneal dissectors or razor-blade knives, was first used for the dissection of lamellar grafts. This method was easily mastered by experienced surgeons but was not simple for the less experienced, particularly in the preparation of large grafts. The Franceschetti-Bock knife[4] made the dissection of small lamellar grafts easier. More recently, the Franceschetti-Doret apparatus[15] for the dissection of the mushroom graft has been modified to permit the semiautomatic dissection of lamellar grafts. The electrokeratotome, which I devised and reported in 1957,[13] made possible the fully automatic dissection of lamellar grafts of the correct thickness and any size, thus simplifying further the technique of dissecting lamellar grafts. Trephines with stops to regulate the depth of penetration of the trephine blade are necessary to dissect lamellar grafts. There are many different models of this type of trephine, and most of them perform well. The selection of the model to be used depends on the personal preference of the individual surgeon. The hand-operated trephine is more universally accepted than the motorized one.

Several instruments very similar in performance have been designed for the dissection of the opacity from the recipient eye. Again the selection of the instrument depends on the personal choice of the surgeon. I have found razor-blade knives, which are always sharp and easily obtainable, very useful for this purpose. Regarding shape, the circular corneal graft dissected with a trephine has become almost universally

accepted in preference to the square graft dissected with a double-bladed knife. Punches for corneal transplantation have not gained popularity.

Penetrating Keratoplasty

As already mentioned, unless lamellar grafts are clearly indicated, penetrating keratoplasty continues to be the operation of choice in a great majority of cases operated for visual improvement. Partial penetrating grafts, when successful, frequently render brilliant results with visions of 20/20 or better, which are seldom obtained with lamellar grafts. Therefore, unless the lamellar graft is clearly indicated for the reasons already set forth, the penetrating graft should be used to obtain optimum visual results. The use of direct sutures has increased the chances for success in keratoplasty in the same manner that the introduction of corneoscleral sutures improved the prognosis for an uneventful recovery after cataract surgery.

The prognosis was uncertain when overlying sutures were used to hold the graft. There was a high incidence of complications, such as synechias, incarceration of the iris in the incision, and even iris hernia. In children and other unruly patients, dislocation of the graft was occasionally observed. The incidence of this complication increased in direct proportion to the increase in the size of the graft. The use of direct suturing eliminated these complications in small and medium grafts. It has also tremendously improved the prognosis in cases of larger grafts. At present an 8 mm. or even larger graft, fixed by direct suturing, cicatrizes well with fewer complications than those previously observed with 5 or 6 mm. grafts when overlying sutures were used.

The size of the graft should correspond to the size of the lesion to be treated. If the corneal opacity in the pupillary area can be replaced with a 6.5 mm. graft, it is neither necessary nor desirable to use an 8 or 9 mm. graft. On the other hand, a dense opacity 8 mm. in diameter which involves the central cornea but is surrounded by a ring of healthy corneal tissue will require a large graft of 8.5 or 9 mm., with its borders in contact with the clear peripheral cornea of the host. This will cicatrize better and the graft is more apt to remain clear than would a small graft of 6 mm. placed in the center of a dense opacity entirely surrounded by scar tissue.

In the same manner a Fuchs' dystrophy involving 7.5 mm. of the central cornea will require at least an 8 mm. corneal graft or the borders will not be surrounded by healthy tissue. If a smaller 6.5 or 7 mm. graft is used in these cases, it will almost certainly result in a recurrence of the dystrophy in the graft.

The treatment of advanced keratoconus also requires the excision of all, or practically all, of the conus, which is replaced by a graft seldom less than 7 mm. in diameter. In these cases a smaller graft of 6 to 7 mm., even when it remains transparent, if set in the protruding area of a not completely excised conus, will result in a refractive error, myopia or high astigmatism severe enough to defeat the purpose of the operation performed for visual purposes. Thus a larger graft, 8 or more millimeters in diameter, should improve the cornea structurally, restoring the curvature to normal or near normal, thereby ensuring better vision. Only keratoconus in the very early stages will benefit, as far as visual improvement is concerned, by grafts of 6 to 6.5 mm. The average small graft used nowadays is seldom less than 6 mm. in diameter. When a small graft is used, the slightest cloudiness within its borders tends to limit its useful visual area.

When overlying sutures were used, a patient had to remain in bed for ten to fourteen days with both eyes bandaged to ensure an uneventful recovery. In spite of this precaution, the incidence of postoperative complications, such as synechias, incarceration of the iris, and even iris hernia, was high. At the present time, for a patient undergoing keratoplasty with a graft of any size fixed with marginal sutures, it is required only that the operated eye be bandaged, and from the time he leaves the operating room he may be ambulatory. In addition, no special diet is necessary. Thus patients have a much more comfortable postoperative course and the complications are fewer than when overlying sutures were used.

Mydriatics to minimize the incidence of synechias in penetrating grafts are no longer needed with the use of direct suturing. If the sutures are applied every 2 or 2.5 mm., the incision thus accurately closed remains watertight and airtight. At the completion of the operation, an air bubble is injected into the anterior chamber to separate the iris from the corneal incision and to minimize the incidence of anterior synechias. If anterior synechias should develop, they should be treated during the fourth postoperative week before they have become firmly established, before they have affected the clarity of the graft, and before ocular tension increases, as it frequently does in these cases. In cases of large 9 to 9.5 mm. penetrating grafts, the iris is closer to the incision than it is with smaller grafts and the incidence of anterior synechias may be higher. This may be minimized by performing peripheral iridectomies in two, three, or even four quadrants, as advocated by Stocker[27] in 1953. A detailed description of the operations for the treatment of anterior synechias is not within the scope of this limited discussion.

Total Penetrating Keratoplasty

Total penetrating keratoplasty, considered a surgical impossibility at the time of the last symposium, may now be carried out successfully. The percentage of successes with visual improvement is low and the percentage of perfectly clear transplants obtained is still lower, but this operation offers the only possibility of functional improvement in very unfavorable eyes with densely opaque corneas, with or without anterior synechias. In these eyes, if they are not glaucomatous and if vision is at least good light perception and projection, a total penetrating keratoplasty is indicated. In order to minimize the incidence of postoperative glaucoma whenever a total or subtotal penetrating keratoplasty is performed in an eye with a normal anterior chamber, the lens should be removed, whether or not it is cataractous, and a large iridectomy performed. A total penetrating graft may remain perfectly clear, even in an eye with total anterior synechia. I operated on such an eye more than ten years ago. The operation consisted in the excision of the whole cornea, atrophic iris completely adherent to the posterior surface of the cornea and cataractous remnants. The vitreous was also found to be adherent to these structures, and vitreous loss took place which necessitated an injection of saline solution at completion of the operation to normalize the ocular tension. In spite of this complicated procedure, the homograft remained perfectly clear and at the end of ten years permitted a good ophthalmoscopic examination of the fundus, which showed macular changes with visual improvement from light perception and projection to 20/100. During this ten year period I performed other total penetrating homokeratoplasties, some of which have remained transparent, and have resulted in pronounced visual improvement. Others have remained only partially transparent, but

functionally the vision is improved. I have reported some of these cases of total penetrating homokeratoplasties during the past ten years.[6-9,11,12]

In 1957, Barraquer[3] reported a case of successful total penetrating autokeratoplasty, and more recently Maumenee[18] reported five more cases of successful total penetrating corneal autotransplants. Maumenee feels that a total penetrating autokeratoplasty has a better chance of remaining transparent than the homograft, as there is no donor-recipient sensitization which may render the transplant cloudy or opaque. Unfortunately, this represents an ideal situation, and instances are not frequent in which the clear cornea of a blind eye of a patient may be used as an autotransplant to restore vision in the fellow eye blinded by a corneal opacity. Thus homokeratoplasty is the only available method in the majority of cases. The cases reported in the literature prove that total penetrating keratoplasty is no longer a surgical impossibility, as frequently stated. The successful transplantation of an entire cornea has been not only a great surgical achievement but also a most interesting biological phenomenon regarding the fate of corneal grafts and whether the graft is replaced by the tissue of the host or whether it preserves its individuality and survives in the midst of the host tissue.

COMBINED LAMELLAR AND PENETRATING GRAFT

The Mushroom Graft

In 1950 Franceschetti and Doret[16] reported a technique using a combined lamellar and penetrating corneal transplant called "mushroom graft." They advocated its use in unfavorable cases similar to those in which a total penetrating graft is indicated. This mushroom graft consisted of a large lamellar transplant (10 or 11 mm.) with a central circular area of 5, 6 or 7 mm. of full-thickness graft. It is prepared semiautomatically with a special instrument designed by the authors. This type of graft is supposed to have the advantage over the total penetrating graft of not altering the angle of the anterior chamber, when present. However, this operation cannot be judged on its merits, as no follow-up report on results obtained has been made available.

In 1953 Stocker[27] reported one case of mushroom graft that remained clear after three months. He did not use the Franceschetti-Doret apparatus to dissect the graft, but rather an ordinary dissector for the preparation of the lamellar graft and a trephine for the preparation of the full-thickness portion of the graft.

Keratoprosthesis

The first attempt to restore vision to patients affected with corneal opacities was by use of an artificial cornea, but it was never considered of practical value. The artificial cornea invariably extruded, leading to loss of the eye. In recent years several investigators have carried out promising animal experimentation and clinical trials with this procedure. In September 1959, I saw two patients who had been operated upon by Joaquin Barraquer. A small plastic button had been placed in the center of the eye and had remained clear for about two years, allowing the patients sufficient vision to carry on varied visual tasks, including the reading of large print. Keratoprosthesis is indicated only in very unfavorable cases in which the prognosis for any type of corneal transplantation is practically nil. Although many of these keratoprostheses are extruded, patients already benefitted by this type of operation prove that it is not completely use-

less in obtaining visual improvement, even though it may be of a temporary nature. Further research and clinical trials may increase the percentage of successful results in these extremely unfavorable cases and make keratoprosthesis a valuable addition to corneal surgery.

Corneal Transplantation in Other Unfavorable Cases

In addition to the cases already mentioned in which a total penetrating keratoplasty, mushroom graft or keratoprosthesis could be used, there are others with severe corneal scarring, often associated with extensive symblepharons, in which no type of corneal transplantation offers any possibility of success. Some of these eyes, formerly considered unfavorable for keratoplasty, may be rehabilitated by procedures of plastic conjunctival repair with or without buccal mucous transplantations, keratectomies and reconstructive keratoplasties as preliminary treatment to improve the eye structurally and render it more favorable for a final keratoplasty for optical purposes. Occasionally in these very unfavorable eyes with dense scarring, the scars may not be too deep and the underlying cornea and sclera may be preserved and in fairly good condition. When the scarred, contracted conjunctiva and the dense opacities over the cornea have been treated, the symblepharon corrected by plastic repair with or without buccal mucous grafts, and the cornea improved structurally by a keratectomy or a lamellar graft, the eye is rendered much more favorable for a final keratoplasty for optical purposes.

DONOR MATERIAL

With the exception of the keratoprosthesis already mentioned, donor material must be corneal tissue. The graft may be either an autograft or a homograft. In the first case, the clear cornea from the blind eye is used to supply the transplant for the fellow eye affected with a corneal opacity. This fortunate circumstance occurs very infrequently; therefore, the only remaining possibility is a homograft. The homograft may be obtained from eyes enucleated because of noncorneal ocular disease and, since the availability of such eyes is very limited, from cadaver eyes which, when properly preserved by refrigeration at 2 or 3° C., may be used even two or three days after death.

In the United States the supply of eyes is still insufficient to meet the demand. Patients must be kept on a waiting list until donor material for the operation is available. During the past few years the establishment of other eye banks, in addition to the New York Eye Bank for Sight Restoration already functioning at the time of the last symposium, has increased the supply and improved the distribution of eyes available for corneal transplantation. These eye banks have enlisted the aid of individuals and organizations, the members of which are asked to will their eyes for this purpose. However, as an increasing number of ophthalmologists become proficient in the techniques of keratoplasty, the demand for donor material will not be met unless legislation, similar to that enacted in other countries, is passed to permit the removal of eyes from cadavers for corneal transplantation.

In an effort to prolong the short period for which the eye can now be preserved, other methods of preservation have been suggested. In 1948 Bürki[5] advocated the use of liquid paraffin, the tissue-storage method formerly used by Carrel. Bürki presented evidence that the corneas of eyes preserved in this way remained viable for several weeks. Rycroft,[24] in 1954, reported successful corneal transplantation using donor ma-

terial stored in liquid paraffin up to three weeks after enucleation. Eastcott and his associates[14] have reported successful lamellar grafts using corneal tissue several weeks after it was frozen at – 79° C.

King[17] has also reported successful lamellar corneal grafts using donor corneas dehydrated in 95 per cent sterile glycerin sealed in a vacuum and stored indefinitely at room temperature. Although this material has not proved as effective for penetrating keratoplasties, the fact that it may be stored indefinitely at room temperature makes it the most promising of all the new methods of preservation, particularly if it is improved to the point that it will render equally good results in penetrating keratoplasty.

Another method of indefinite storage of donor material has been reported by Payrau, Bonel and Guyard,[23] who used lyophilized corneas and obtained good results in lamellar keratoplasties.

IRRADIATION

Beta irradiation before corneal transplantation, or during the postoperative course, properly used for the treatment of corneal vascularization is an invaluable aid in procuring favorable results. Adequate training in the handling of beta rays is essential for successful corneal surgery. Irradiation of the eye must be kept to a minimum because overdosage of beta rays will later deprive the cornea of nutrition, interfering with fibroblastic proliferation and adequate cicatrization of the graft.

COMMENTS

In addition to the many improvements in techniques, instrumentation and irradiation, credit for the increased percentage of success in keratoplasty must be given to the use of such medical innovations as antibiotics to diminish infections both in the patient and the donor material; corticosteroids, both topical and systemic, to control inflammation and vascularization; the carbonic anhydrase inhibitors to keep the ocular tension within normal limits (especially useful in the postoperative treatment of total penetrating grafts); and the antihistaminics, which limit the allergic reaction in the eye, whether caused by a donor-recipient sensitization or by bacterial allergens.

The advancement in techniques and instrumentation outlined in this article, the application of beta rays and the use of antibiotics, corticosteroids, carbonic anhydrase inhibitors and antihistaminics, and other general supportive measures have greatly expanded the indications for keratoplasty and increased the number of patients who may be benefited by this type of surgery. Corneal transplantation is no longer an uncertain procedure. When the indications are well established, it is possible to predict fairly accurately the degree of success to be obtained in an individual case.

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IV

THERAPEUTIC KERATOPLASTY

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THERAPEUTIC keratoplasty refers to the use of a corneal graft for the purpose of terminating or improving an active disease of the cornea or for the purpose of repairing an anatomical defect in the cornea, such as a descemetocele or perforation. Within the past ten years, increasing attention has been directed to the use of corneal grafts for therapeutic purposes. In actual practice, many therapeutic keratoplasties are also optical, in that the therapeutic graft results in visual improvement concomitantly with improvement in the disease of the recipient eye. It may be stated as a corollary that therapeutic keratoplasty is directed principally to the improvement of symptoms, but optical keratoplasty is directed primarily to the improvement of function. The development of therapeutic keratoplasty has been closely associated with the development of the technique of lamellar grafts. However, therapeutic keratoplasty is not limited entirely to the use of lamellar grafts. Perforating grafts may also be used therapeutically in some conditions.

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HISTORICAL

Therapeutic corneal grafting was stimulated by several important observations made on penetrating grafts:

First, there was the observation that surprisingly little inflammatory reaction occurred in the eye after an uncomplicated penetrating optical keratoplasty.

Second, in many cases in which operation was performed in the course of a chronic inflammation, it was noted that the condition did not worsen from the trauma of the operation but, on the contrary, frequently improved.

Third, it was noted by many surgeons that after a transparent or partially transparent corneal transplant, the opacified cornea about the transplant often underwent an increase in clarity.

Much of the recent work on lamellar transplantation as well as on therapeutic keratoplasty has been carried on in European centers, principally the French, Swiss and Russian. Well-deserved credit must be given also to the pioneers in keratoplasty such as Fuchs,[13] who reported a number of therapeutic grafts; Von Hippel,[41] who applied corneal grafts in the treatment of severe ulcers in 1903, and Sgrosso,[35] who used corneal grafts in the treatment of rodent ulcer in 1906. It was Filatov[4] of Odessa who gave the greatest impetus to the use of corneal transplantation for therapeutic

purposes. During the 1930's he published a series of articles emphasizing the "trophic" action of keratoplasty. By this he referred to the apparent clearing effect of corneal grafts on the surrounding recipient cornea. Filatov believed that this change in the recipient cornea was due to a biologic effect exerted by the transplanted tissue. He indicated that small lamellar grafts applied in the vicinity of a partially opaque or edematous graft could influence the clearing of the latter. In 1933 he suggested that the transplant might be improved by implanting healthy corneal tissue into the neighboring host cornea after the initial keratoplasty. This observation also led him to suggest the use of various tissue extracts and embryonic extracts for the purpose of improving the state of a cloudy cornea or of a cloudy corneal graft. These methods have never been accepted in this country, although a number of European ophthalmologists have adopted their use enthusiastically.

It is apparent that it would be very difficult to devise controlled experiments to prove or disprove the biologic action of a corneal graft in improving a corneal opacity occurring naturally. In an attempt to evaluate this phenomenon, a series of corneal grafts, both penetrating and lamellar, were performed on rabbit eyes in which a standard corneal burn had been produced by hydrochloric acid.[5] There was clearing of the recipient cornea around such grafts, but only in the case of penetrating grafts and not in the lamellar grafts. This suggested that at least in the rabbit there was no biologic effect of the corneal transplant which produced the clearing of the adjacent recipient cornea, but that the phenomenon was rather the result of metabolic changes produced by the operation itself. Arthur Lister,[23] in a review of keratoplasty published in 1951, commented as follows:

> The mechanism in both (preparatory and therapeutic grafts) is obscure and to invoke the term biogenic stimulation does not really make it less so, nor is it certain whether it is the graft or the mere operative interference that is responsible for the clearing, nor that the graft need be placed in the cornea itself.

He added also that he observed marked clearing of a corneal scar after he had, by chance, partially cut the cornea around the scar with a trephine. Kurz,[22] also, recommended the use of simple trephine incisions about severe corneal opacities as a means of improving the state of a recipient cornea. The observation of Jayle and Dor[20] that perilimbal grafts of buccal mucosa as a preliminary to lamellar keratoplasty often eliminated the need for the keratoplasty, is another evidence of the question marks which surround the so-called "trophic" action of corneal tissue.

Despite the many unknowns in therapeutic keratoplasty and the questionable relationship between the transplanted corneal tissue itself and the improvement in the recipient tissue, it is nevertheless a well-documented observation that many active inflammatory processes in the cornea have been benefitted by the application of a corneal graft. What are the means by which such a corneal transplant may exert a beneficial effect upon the recipient? At least five possible effects suggest themselves, any or all of which may be operative in any particular case: (1) The benefit may result from the removal of diseased or necrotic tissue. (2) The clearing may be due to the removal of infective organisms including their exotoxins and endotoxins. (3) There may be a temporary or permanent reduction in vascularity of the area which brings about a diminution or inhibition of the allergic reaction. (4) There may possibly be a beneficial effect from the introduction of fixed antibodies in the donor tissue. (5) There is the

possible biological effect of the introduction of new tissue, which has already been mentioned.

INDICATIONS AND RESULTS OF THERAPEUTIC KERATOPLASTY

If one attempts to evaluate the results of therapeutic keratoplasty, one quickly discovers that such an evaluation is even more difficult than was that of optical keratoplasty in its early days. Whereas in optical keratoplasty one used as a yardstick of success the relatively quantitative measurement of visual acuity, in therapeutic keratoplasty two goals are sought: the termination of the disease process or state and the improvement of visual function. It is therefore possible to achieve the first of these with relatively little improvement in visual acuity. A lamellar graft may successfully bring about the healing of a perforating ulcer, but it may not be transparent enough to improve vision satisfactorily. Such a therapeutic graft must be considered successful even though a subsequent optical keratoplasty will be necessary. For this reason, the case reports in the literature are often lacking in quantitative detail and the period of follow-up observation is frequently short.

The first significant series of therapeutic keratoplasties was presented by Paufique.[28] It included 40 cases, of which the results in 30 were described as "good." Rougier[33] expanded this series to 89 cases in the monograph which he published in 1950, covering Paufique's material of 500 lamellar transplants. Approximately 75 per cent of these therapeutic grafts are listed as giving good results.

On the basis of approximately 300 therapeutic keratoplasties, both penetrating and lamellar, gathered from the literature and from personal experience, certain conclusions may be drawn which appear valid at present, but which may have to be modified in the light of further experience. More than one third of these keratoplasties were done in cases of chronic or recurrent herpes simplex keratitis. The conclusions reached in this series depict in a general way the sum of experience to date with therapeutic keratoplasty in various corneal disorders (table I). In some diseases, the number of cases reported is so small that no conclusions are warranted. These have been designated as "uncertain." Where approximately two thirds of the reported or observed cases were improved, the results are designated "good." If less than 25 per cent of the cases were improved, the result is described as "poor." Conditions falling between these two groups are noted as "fair."

INDICATIONS FOR THERAPEUTIC KERATOPLASTY

The indications for therapeutic corneal grafting may be divided into two broad categories: (1) biologic and (2) tectonic. In the first group are cases of active infections, such as herpes simplex keratitis, bacterial or mycotic ulcers, or other acute or subacute inflammations of the cornea such as interstitial keratitis. In the second group are cases of descemetocele, corneal perforation or fistula, and cases of active degenerative processes such as bullous keratopathy, endothelial-epithelial dystrophy, late mustard gas keratopathy, and progressive degenerative changes due to other chemical or physical injuries. The dividing line between the two groups is often not a sharp one, as when an infective keratitis results in perforation.

1. *Chronic and Recurrent Herpes Simplex Keratitis (Metaherpetic, Disciform, Chronic Stromal Herpetic Keratitis)*

These cases fall into three general groups, though there may be some over-

TABLE I

CORNEAL DISEASES IN WHICH THERAPEUTIC GRAFTS HAVE BEEN USED

	RESULTS
KERATITIS (SUPERFICIAL)	(CONSENSUS)
Herpes simplex, chronic or recurrent (metaherpetic)	Good
Herpes zoster	Good
Purulent ulcer or abscess	Fair
Mooren's ulcer	Uncertain
Trachoma	Good (lamellar)
Rosacea keratitis	Fair
KERATITIS (DEEP)	
Herpes simplex (chronic, interstitial, disciform)	Good
Syphilitic (active)	Uncertain
Tuberculous (active)	Uncertain
TRAUMA	
Chemical burns	Fair
CORNEAL DYSTROPHIES AND DEGENERATIONS	
Fuchs' dystrophy (primary) (early stages)	Good (penetrating) Poor (lamellar)
Endo-epithelial dystrophy (secondary)	
After cataract operation	Fair
Secondary to uveitis	Fair
Bullous keratopathy	Poor
Late mustard gas keratopathy	Good (lamellar)
Recurrent pterygium	Good
DESCEMETOCELE OR FISTULA	Good (lamellar; penetrating if perforated)

lapping: (1) inactive corneal scars with a history of numerous recurrences of dendritic or similar lesions in the area of scarring; (2) chronic superficial keratitis, either diffuse or circumscribed (metaherpetic) persisting for many months or recurring over a long period of time; (3) chronic stromal keratitis lasting for months, often leading to stromal necrosis and sometimes to descemetocele or perforation. The first category may be treated by penetrating keratoplasty as in optical keratoplasty, to obtain the maximal visual improvement. It is the frequency of recurrence in recent years that places these cases in the realm of therapeutic keratoplasty. The second group is usually best han-

dled by lamellar keratoplasty, particularly if the involvement is diffuse or if there is an associated severe uveitis. Cases in the third group may be treated by penetrating or lamellar keratoplasty depending on the depth of the stromal disease and extent of the corneal involvement. In general, if all of the visibly diseased tissue cannot be encompassed by a graft 8 mm. in diameter, a lamellar graft is preferable to a penetrating graft (fig. 1). This decision must often be modified by other factors such as the thickness of the cornea, the degree of vascularization and the degree of uveitis.

but three showed improvement following keratoplasty. Only one was worse following therapy. Recurrence was observed in 9 cases over a five-year period.

Recurrence of herpetic keratitis in the graft is particularly apt to take place when the visible lesion cannot be excised completely either because the lesion is too extensive or because it is so situated that a portion of the lesion reaches the limbus. In such cases, the border of the transplant will be in contact with diseased tissue at some point. The recurrence of keratitis after therapeutic keratoplasty always appeared first at this

FIG. 1—(Left) Chronic keratitis due to herpes simplex. The lesion is a diffuse one involving the superficial stroma and has been active for almost two years. (Right) A 9 mm. lamellar graft was necessary to remove all of the affected tissue.

There is general agreement that these these conditions related to herpes simplex infection represent the most frequent and best indications for therapeutic keratoplasty. In a total of 13 cases, Paufique[30] reported good results in all but one. Franceschetti,[11] Gallenga,[14] Foster,[9] Bock,[1] Giani,[15] Hobbs,[18] Paton[26] and others have also described good results in herpetic keratitis. Hogan[19] reported results of keratoplasty on 18 patients with various types of corneal herpetic disease and considered the results gratifying. Fine[7] reported on 48 operations for various forms of corneal herpes, 32 in cases of active disease. All

site. Four of the nine cases of recurrence remained limited to a small area of the graft adjacent to this site of incomplete excision. If no other complications intervene, clinical improvement may be effected even in the presence of a limited recurrence. Two cases have been observed of recurrence of herpetic keratitis in the form of dendritic ulcers in a clear transplant. One was in a favorable case of healed disciform keratitis, in which more than a year after a successful keratoplasty, a dendritic ulcer appeared in the rim of recipient cornea and spread slowly into the transparent graft. The second was a case of diffuse chronic

FIG. 2—(Top) Deep chronic keratitis due to herpes simplex with recurrences over fifteen years. The lesion extends to the limbus superiorly. (Center) An 8 mm. penetrating transplant replaced all the visibly involved cornea except for a tiny area at the 1 o'clock position. (Bottom) Two months later there has been a recurrence of a scalloped superficial ulcer in the superior nasal quadrant of the transplant, preceded by a typical dendritic figure. The apparent density of the ulcer is due to fluorescein stain.

FIG. 3—(Top) Deep chronic herpetic keratitis of a year's duration with heavy vascularization from the inferior limbus. (Center) After three weeks of therapy with topical fluorohydrocortisone, the lesion is much more circumscribed, less vascular and can be encompassed by a graft 8 mm. in diameter. The associated uveitis has improved also. (Bottom) Transparent 8 mm. penetrating graft placed eccentrically downward to include all of the infiltrated stroma. There has been no activity for sixteen months.

keratitis involving the entire cornea recurring over a period of fifteen years. A transparent penetrating transplant was involved by a dendritic ulcer two months after surgery and went on to a chronic lesion resembling the original (fig. 2). The other instances of recurrence appeared as an infiltration and vascularization of the stroma of the transplant adjacent to the line of union.

Cases of chronic or recurrent herpetic keratitis in which therapeutic keratoplasty is indicated often present severe irritative symptoms, active uveitis and marked vascularization of the cornea. It has been found that preliminary treat-

FIG. 4—(Left) Generalized atopic dermatitis complicated by a chronic superficial keratitis due to herpes simplex, preceded by a typical dendritic ulcer. Treatment with systemic corticosteroids, which benefited the disabling dermatitis greatly, caused an exacerbation of the keratitis and had to be discontinued. (Right) A 9 mm. lamellar transplant replaced all of the involved cornea. Systemic therapy with corticosteroids was reinstituted one week after operation, with prompt improvement in the dermatitis. There has been no recurrence in two years.

FIG. 5—(Left) Recurrent herepetic keratitis over a period of seven years with marked thinning of the central stroma, perforation and iris incarceration. No steroids had been used. (Right) An 8 mm. penetrating transplant performed twelve hours after perforation. The iris incarceration was freed without iridectomy.

FIG. 6—(Left) Severe deep chronic herpetic keratitis with perforation closed temporarily by a large conjunctival flap. The perforation recurred as the flap retracted. The anterior chamber is absent. (Right) The conjunctival flap was dissected free from the cornea and resected at the limbus. An 8 mm. penetrating transplant and iridectomy were performed at the same time. No recurrence after fifteen months. Corrected vision, 20/40.

ment of these eyes with topical steroids, or parenteral steroids if the uveitis is severe, leads to marked improvement in the inflammatory signs and symptoms, reduction in the corneal vascularity and often a decrease in the size of the lesion. In the series reported by Fine,[6] all cases were treated in this manner for a period of two to three weeks under frequent observation, prior to keratoplasty. No instances of aggravation or reactivation of the keratitis were encountered. The surgical procedure is greatly facilitated by the decreased vascularity and absence of inflammation. Topical steroids were also applied daily at the time of dressing from the first postoperative day and for a period of six to eight weeks (figs. 3, 4, 5, 6).*

2. *Herpes Zoster Keratitis*

Franceschetti[12] and Paufique[29] recommend the use of a therapeutic lamellar graft in herpes zoster keratitis, particularly of the chronic disciform type. Unless there is marked loss of stromal substance and threatened perforation, it is probably best to postpone the keratoplasty until there is some return of corneal sensitivity. The results in two patients I have treated in this manner have been good.[8]

3. *Purulent Keratitis or Corneal Abscess*

Excellent results have been reported through the use of therapeutic lamellar grafts in severe corneal ulcer or abscess during the inflammatory stage of the disease. Gallenga[14] obtained good results in eight cases of severe hypopyon ulcer treated with lamellar grafts. Löhlein reported successful results in twelve out of thirteen cases of penetrating grafts in patients with sepiginous ulcer, although in none was there a substantial increase in vision. Maumenee[25] has demonstrated several remarkable results from therapeutic lamellar grafts in cases of corneal abscess due to hemolytic staphylococcus and pseudomonas. He expressed the opinion that maximal improvement should be obtained with medical therapy and the ulcer allowed to clear as much as possible before the therapeutic graft is applied. His results in three cases of mycotic abscess were poor, all three eyes being lost. Recurrence of the mycotic infection was noted in the bed of the graft and in the anterior chamber on histologic examination.

4. *Mooren's Ulcer*

Few cases of Mooren's ulcer treated with therapeutic grafts are to be found in the literature. Paton and Swartz[27] report that of two lamellar grafts in Mooren's ulcer, one remained clear. Monfette also reported successful healing of a case of Mooren's ulcer which had proved resistant to other forms of treatment. Maumenee[25] performed a corneal-scleral lamellar graft, including all of the cornea and a 2-millimeter margin of scleral tissue, and observed recurrence of the Mooren's ulcer six months later. In a recent article Grana[17] reported healing after two lamellar keratoplasties.

5. *Trachoma*

The results of penetrating keratoplasty in cases of trachoma have been rather poor, with visual improvement in less than half. The pathologic changes in the conjunctiva and the tarsus, as well as the marked vascularity of the corneal surface are probably contributory to

*An interesting observation in this group of cases pretreated with corticosteroids is that the incidence of late edema of the graft (immune reaction) was considerably less than in the total group of optical keratoplasties: 4 per cent as compared with 15 per cent. In these heavily vascularized corneas one would have expected a high incidence of immune reactions. The number of cases is too small to be statistically significant, but the possible role of pretreatment with corticosteroids in limiting the reactions is worth further study.

FIG. 7—Trachomatous pannus with lamellar graft. The transplant remained slightly edematous four months after operation.

these disappointing results. In the author's experience, trachomatous keratitis was the only condition in which a corneal fistula resulted following a penetrating graft; this occurred in two cases. On the other hand, excellent results were reported by Wasserman[42] using therapeutic lamellar grafts, with improvement in twenty-four out of thirty-two patients. Giani and Fofanno,[16] and Jayle and Roulat[21] also describe good results from the use of lamellar keratoplasty in the course of trachomatous pannus. These observations suggest that at least for the present the lamellar graft should be considered the method of choice in trachoma, after adequate medical therapy with antibiotics (fig. 7).

6. *Rosacea Keratitis*

The number of cases requiring therapeutic keratoplasty for this condition is quite limited. Because of the tendency for the corneal infiltrates and ulcers to spread more centrally with each recurrence, therapeutic lamellar keratoplasty should be considered in those patients who show frequent recurrence in a localized area of the cornea, in spite of antibiotic, nutritional and hormonal therapy. Figure 8 demonstrates such a case in which the recurrences were terminated by an eccentric lamellar transplant.

7. *Interstitial Keratitis Due to Syphilis*

Sourdille[36] and Paufique[28,29] have listed active deep syphilitic keratitis among the most favorable conditions for therapeutic grafting. Sourdille reported unusual improvement from peripheral lamellar grafts 4 mm. in diameter applied during the active period of the interstitial keratitis in four patients. It should be noted, however, that this treatment was combined with a course of penicillin. The beneficial effect of therapeutic lamellar grafts during the active stage of interstitial keratitis was also

FIG. 8—(Left) Recurrent keratitis associated with acne rosacea. A lesion has extended more centralward with each recurrence. (Right) The area of keratitis has been excised and replaced by a 6 mm. lamellar graft. The line of union in the pupillary area lies just outside the visual axis, and the visual acuity has remained 20/30.

noted by Franceschetti and Doret.[11] Franceschetti has expressed enthusiasm for the therapeutic graft in acute interstitial keratitis:

> The graft is actually regaining the favor of ophthalmologists since the cortisone treatment replacing surgical therapy gives rise to extremely frequent relapses. . . . The tendency at the present time is a return to the therapeutic graft giving excellent results of a permanent nature and freedom from relapses.

The evaluation of such reports of the therapeutic effect of corneal tissue is difficult in the face of the fact that in this country over 70 per cent of the cases of syphilitic interstitial keratitis have a final visual acuity of 20/40 or better. There comes also to mind the report of Jayle and Dor,[20] who describe a similar good response from the grafting of buccal mucosa at the perilimbal area.

8. *Tuberculous Deep Keratitis*

The authors who have recommended the use of therapeutic grafts during the acute stage of syphilitic interstitial keratitis have also recommended it in tuberculous deep keratitis. Evaluation of such therapy is difficult in view of the marked tendency to relapses and remissions. The condition, fortunately, is relatively rare in this country and there have not been opportunities for studying the therapeutic effect of corneal grafts during the active stages. In view of the fact that the zone of infiltration is often in the deepest layers of the corneal stroma, the advisability of a lamellar keratoplasty for therapeutic purposes in such cases seems questionable. Penetrating optical keratoplasty in the inactive stage gives good results. It would therefore seem preferable to treat this condition with the usual antituberculous agents and corticosteroids until it becomes quiescent and then to perform optical keratoplasty.

9. *Chemical Injuries*

The outlook for a transparent corneal graft in cases of severe chemical burns is extremely poor. Filatov[4] and others have recommended the use of ameliorating grafts in such instances to improve the condition of the leukoma prior to a final penetrating graft. These ameliorating grafts may be small penetrating grafts done at the periphery, or small lamellar grafts, or even a total lamellar graft. Such grafts are said to exert a favorable influence on the leukoma so that the final optical keratoplasty has a better chance for success. Sourdille[36] believed that it was possible to obtain improvement in cases of severe chemical injury through total lamellar transplants, particularly after burns with alkali. Such transplants could be done during the active phase of the injury, and he reported a successful result from a keratoplasty performed three weeks after an ammonia burn. Paufique[29] recommended lamellar transplants in the treatment of chemical burns in order to improve the corneal bed for a later penetrating graft. Paton[26] has reported relief of symptoms in two cases of sulphur dioxide burn.

Experience with the use of lamellar ameliorating grafts for the purpose of improving the cornea in cases of severe chemical burns has been very disappointing, the lamellar transplant showing the same tendency to chronic edema and opacification as the penetrating transplant. In the less severe chemical injuries it is possible to obtain a partially transparent and rarely a completely transparent graft, either lamellar or penetrating. In alkali burns of moderate severity in which the cornea is not completely opacified, there is often a chronic or recurring central or paracentral corneal ulceration which produces a great deal of discomfort. Such patients may be benefited by therapeutic lamellar

transplants and, in cases in which the opacity extends through the stroma, even by therapeutic penetrating transplants. Such transplants will often appear perfectly transparent and lustrous for a period of a year or more, with excellent visual improvement, and then will slowly undergo a chronic disturbance of the epithelium which reduces the visual acuity to 20/200 or less. In spite of this, the patient usually remains symptom-free. Therapeutic keratoplasty in these cases should be preceded by a careful superficial keratectomy to remove the vascular membrane or pseudopterygium which is usually present, peritomy and recession of the conjunctiva to a point four or five millimeters from the limbus, leaving a ring of bare sclera about the cornea, and irradiation of the border of the recessed conjunctiva with a strontium 90 applicator on the fourth or fifth postoperative day. This will usually result in a marked reduction of the vascularity of the cornea and will provide a more favorable bed for the therapeutic graft. Irradiation of the cornea itself is to be avoided. Heavy preoperative radiation of the cornea in an attempt to eliminate long-standing vascularization in such severely injured eyes may result in non-union of the corneal transplant, or in late degenerative changes in the cornea, progressing even to perforation[3] (figs. 9 and 10).

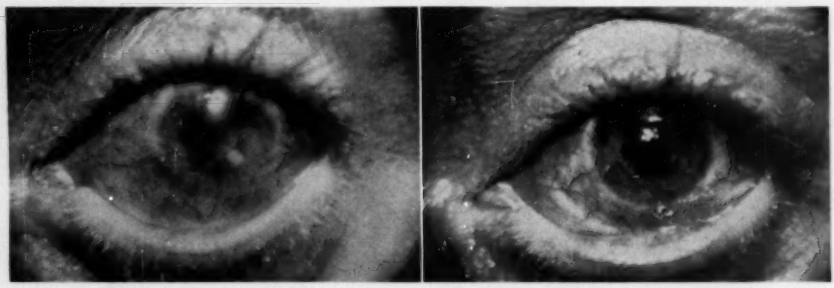

FIG. 9—(Left) Severe ammonia burn with heavy vascularization and chronic ulceration of the central area of the cornea. The fellow eye was lost. (Right) Following peritomy, recession of the conjunctiva, and beta irradiation over the line of recessed conjunctiva, the corneal vascularity was greatly reduced. A 9 mm. lamellar graft shows only a faint opacity at the interface.

10. *Fuchs' Dystrophy (Primary Endothelial-Epithelial Dystrophy)*

Fuchs' dystrophy is listed here as a condition for which therapeutic keratoplasty rather than optical keratoplasty is indicated, although the two goals are closely related. It is, nevertheless, one of the few conditions in which optical keratoplasty is performed in the presence of an active edema of the stroma and active disease of the endothelial and epithelial surfaces. Until the past few years it was believed to be one of the least favorable conditions for corneal transplantation.

Stocker[37] in 1952 reported two successful grafts for Fuchs' dystrophy, and in 1956 he reported twelve more cases, with good results in seven eyes and failure in three.[38] Paton, in 1953, reported five successful grafts out of thirteen cases of Fuchs' dystrophy. In 1958 he again described the results of twenty-three keratoplasties performed in twenty eyes with clear grafts in 70 per cent.[27] Successful results may be expected in

FIG. 10—(Top) Severe ammonia burn with large chronic central ulcer and heavy vascularization of the peripheral cornea. (Center) After superficial keratectomy, peritomy, recession of the conjunctiva and beta irradiation, the chronic ulcer has healed and the vascularity is greatly reduced. (Bottom) A 7 mm. penetrating corneal transplant performed three months after the preparatory operation. The transplant remained perfectly transparent with vision 20/40 for more than a year and then developed a mild chronic epithelial edema which has persisted for two years. Vision has decreased to 20/100.

80 per cent of early or moderately advanced Fuchs' dystrophy, but only in about 50 per cent of advanced cases. This means, in effect, that the transplant should be performed while the area of corneal edema is limited to the central portion of the cornea. It has been stated that the graft should be large enough to include all of the diseased endothelial surface and that a clear graft may not be obtained when the endothelial dystrophy extends to the limbus. In most cases of Fuchs' dystrophy coming to surgery, the endothelial dystrophy may be observed over the entire cornea, although usually it appears more severe centrally. The important factor seems to be that the margins of the graft shall lie outside the edematous portion of the cornea. This usually means a graft seven or eight millimeters in diameter.

The question as to whether the dystrophy may ultimately recur in the area of the transplant may not yet be answered. Very few successful cases have been followed more than five or six years, and since the development of the dystrophy is naturally a very slow one, this is not a sufficient period of observation. From a practical standpoint, however, the question is not an important one, since the majority of these patients are in their late years by the time the dystrophy has progressed to the point where surgery is indicated. In a group of eighteen patients in whom penetrating homografts were performed for Fuchs' dystrophy, the average age was 66.[8] All of the patients were women. The results were similar to those reported by Paton.

The therapeutic aspects of corneal transplantation in Fuchs' dystrophy becomes paramount in those cases which are associated with cataract. Approximately half of the eyes with Fuchs' dystrophy in which keratoplasty is indicated have a degree of lens opacity sufficient to interfere with vision. The disastrous consequences of simple cataract extraction in cases of Fuchs' dystrophy are well known. It is therefore recommended that in those cases of cataract and endothelial dystrophy in which there is actual stromal edema, a therapeutic penetrating keratoplasty be carried out six to eight

FIG. 11—(Top) Fuchs' dystrophy, moderately advanced. Vision 20/400. (Center) Completely transparent 8 mm. penetrating transplant one year after keratoplasty. There is advanced nuclear sclerosis of the lens. (Bottom) One month after routine cataract extraction the graft remained perfectly transparent and has continued so for twenty-eight months. Corrected vision, 20/20.

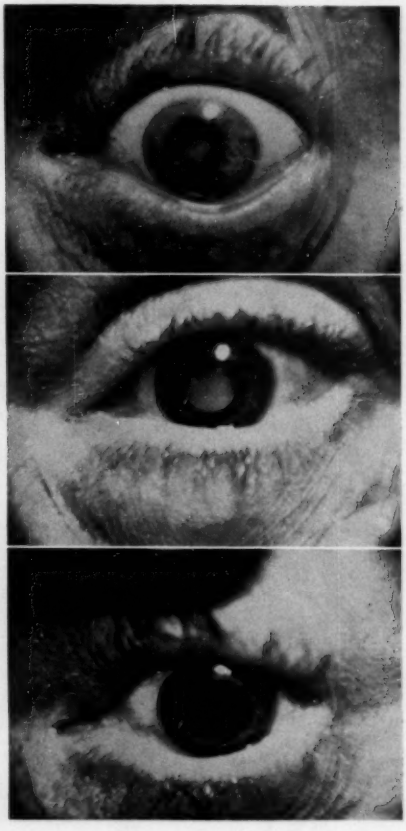

FIG. 12—(Top) Fuchs' dystrophy, early. An immature cataract is present. (Center) Transparent 7 mm. penetrating graft eight months following keratoplasty. The cataract has become hypermature. (Bottom) Six months following a routine intracapsular cataract extraction combined with iridectomy there is a slight edema of the upper third of the cornea. Corrected visual acuity, 20/40. There is no contact between vitreous and the corneal endothelium.

months prior to the cataract extraction. Although both operations may be carried out at the same time, the hazard of vitreous herniation or prolapse and contact with the keratoplasty wound is too serious to warrant such a double operation as a routine procedure. Again, if a successful transplant is obtained, the visual acuity may be improved sufficiently in spite of the cataract (which is often of the nuclear type) that the elderly patient may be well advised not to undergo a cataract extraction. There are at present insufficient cases in which cataract extraction has been performed after a successful keratopasty in Fuchs' dystrophy to permit a firm conclusion. It appears from present reports that at

FIG. 13—(Left) Fuchs' dystrophy, advanced, in a woman aged 82. There is a large epithelial bulla. The anterior chamber is very shallow and there is nuclear sclerosis of the lens. An iridectomy had been performed two years earlier and was followed by a rapid increase in the corneal edema. The left eye had been lost following an iridencleisis operation. Vision: finger counting. (Right) Transparent 8 mm. penetrating graft. Vision: 20/70 two years following operation. The cataract has not been removed.

least some of the clear transplants will become cloudy after cataract operation, possibly between 30 and 50 per cent. Some of the factors which may influence this are the length of the interval between the keratoplasty and the cataract extraction, herniation of the vitreous face into the anterior chamber and possible contact of the endothelium, and the severity of the endothelial changes in the peripheral cornea. There are insufficient data to evaluate these, but it is the clinical impression that an interval of at least six months should elapse between the operations (figs. 11, 12, 13, 14).

11. *Secondary Endothelial-Epithelial Dystrophy (Degeneration)*

In this category are included the corneal dystrophy following complicated cataract extractions and the dystrophy following a long-standing recurring uveitis. Both of these resemble bullous keratopathy, but they will not be considered in the same category with bullous

FIG. 14—(Top) Fuchs' dystrophy, markedly advanced, bilateral. Vision: hand movements. (Center) Clear 8 mm. penetrating transplant. Vision: 20/40. (Bottom) The same patient, demonstrating the striking contrast in appearance between the operated right eye and the unoperated left eye.

keratopathy inasmuch as they present special problems in treatment arising from the fact that such eyes are often undergoing an operation for optical as well as reparative reasons. In most cases it is the only eye. On the other hand, the usual bullous keratopathy is found in a blind, or almost blind, eye, and if keratoplasty is undertaken, it is purely for relief of pain and photophobia. The corneal edema associated with aphakia after more delicate Castroviejo spatula. Great care must be taken to prevent prolapse of vitreous through the corneal opening and to prevent contact of the vitreous face with the corneal graft. Such contact with the endothelial surface of the graft leads to opacification of the transplant in every instance, although a fine vitreous strand to the line of union is not incompatible with a perfectly transparent graft (fig. 15). A technique which has

FIG. 15—(Left) Severe corneal edema secondary to recurrent uveitis, aphakia and secondary glaucoma. The vitreous face had been needled for pupillary block, and two cyclodialyses and several cyclodiathermy operations had been performed. (Right) A 7 mm. penetrating transplant was placed in a manner to avoid the peripheral iris adhesions. Vitreous was aspirated through the pars plana before the anterior chamber was opened. After the graft was sutured, the anterior chamber was filled with air. A fine vitreous strand reaches the line of union above, but the transplant has remained perfectly clear.

a complicated cataract extraction usually involves the entire corneal area. The edema is often extreme and extends to the limbus. Frequently the cornea has become thickened to a degree that the anterior chamber is very shallow, and in a great many cases the iris is in contact with the cornea over a wide area. Usually there is also secondary glaucoma. If a therapeutic result is to be obtained in such cases, the corneal transplantation must be a large one. These are cases in which a subtotal or even a total graft is indicated. At the same time there should be a wide resection of the iris if it is in contact with the posterior surface of the cornea or threatens to become so. Smaller and less firm adhesions of the peripheral iris may be slipped free with a cyclodialysis spatula or with the proved effective is the aspiration of vitreous through the pars plana prior to opening the eye. The area of cornea to be removed is trephined to the depths of the deep stroma without perforating, using a trephine with a stop adjusted to the proper depth of penetration. Two or three punctures are made over the pars plana with a diathermy electrode, 1.0 or 1.5 millimeters in length, similar to the applications which are made in a cyclodiathermy operation. A small puncture is made through the sclera with a sharp Wheeler knife, and 0.25 to 0.50 cc. of vitreous is aspirated through a 23-gauge needle. The vitreous in these cases is usually liquefied and can be removed through a small-caliber needle of this type. Following softening of the eye, the anterior chamber is opened through

the trephine incision with a delicate knife and the dissection of the corneal button completed with scissors. The use of scleral supporting rings may also be helpful. The pupils should be constricted prior to the operation if possible, but most frequently these eyes are in a pathologic state in which the size of the pupil cannot be influenced by medication. A watertight closure of the wound with direct sutures and immediate restoration of the anterior chamber are absolute requisites for success. A bubble of air behind the graft is very helpful in avoiding the complication of vitreous contact with the cornea. The patient should be kept face up to keep the air behind the graft as long as a sufficiently large bubble is present. With these precautions the results should be similar to those obtained in the more advanced cases of primary Fuchs' dystrophy, that is, improvement in about 50 per cent of cases.

The corneal dystrophy following a long-standing uveitis is usually less severe and less widespread. Frequently the edema is limited to the central portion of the cornea. In such cases the corneal transplant need not be as large, and if the problem of aphakia is not present, the prognosis is somewhat better than in cases of dystrophy following cataract extraction. If a complicated cataract is present, the corneal transplant should be performed at least six months before cataract extraction, just as in Fuchs' dystrophy. There may be an occasional exception to this rule when an intumescent or a hypermature cataract is present and must be removed at the time of the keratoplasty.

12. *Bullous Keratopathy*

The results from keratoplasty in relieving the symptoms of bullous keratopathy have been uniformly poor when penetrating transplants have been employed. The results have been somewhat more encouraging with the use of lamellar grafts. Stocker[37] has suggested that the improvement which at times results after lamellar corneal grafting in cases of bullous keratopathy is due to the presence of a thin connective tissue membrane at the interface between the recipient cornea and the graft. He reasoned that such a membrane tends to reduce the passage of fluid into the overlying stroma of the graft. Paton[26] described four lamellar grafts and one penetrating graft performed for bullous keratopathy. All of the graft became nebulous, but three of the patients with lamellar grafts obtained relief of symptoms. If the stromal edema is not extreme, there is little difficulty in obtaining satisfactory union of a lamellar graft in cases of bullous keratopathy, and since relief of symptoms may be expected in some cases, the procedure may be recommended. However, in cases in which there is marked edema of the stroma, the lamellar graft often becomes tremendously swollen and may unite poorly, with an overriding swollen border which produces as serious symptoms as the bullous keratopathy. In such cases it appears preferable to treat the condition nonsurgically with hypertonic solutions or ointments, dry heat or retrobulbar injection of alcohol when indicated.

13. *Late Keratopathy Due to Mustard Gas or Other Agents*

The chronic relapsing keratopathy which appears many years after a mustard gas burn seldom shows complete remission and progresses steadily to serious visual impairment. There is a slowly progressive, irregular degeneration of the superficial stroma with marked irregular astigmatism and some opacification. In practically all cases both eyes are involved and the interpalpebral area

suffers most severely. Because of the long interval between the original injury with mustard gas, usually during World War I, and the onset of symptoms, eight years or more later, the relationship may not be suspected. A pale avascular circumcorneal conjunctival zone in which there are abnormal vessels of irregular caliber with fusiform dilatations and small tortuous angiomatous-appearing formations should lead one to suspect such a keratopathy.[40] A very similar late keratopathy results from exposure to methyl disulphide. In six patients with such chronic keratopathy of more than ten years' duration, and with marked visual impairment, excellent results were obtained from large therapeutic lamellar grafts.[8] Because of the predilection of the disease for the interpalpebral area, four of the six transplants were of an unusual quadrilateral shape approximately 8 by 10 mm. in size. The horizontal incisions encompassing the pupillary zone were made with a double-bladed knife of Castroviejo, the blades being adjusted to a separation which would encompass the thinned-out portion of the cornea. The vertical incisions at the limbus can be made freehand. In all cases there has been dramatic relief of the irritative symptoms and satisfactory improvement in vision. Two of the grafts have been observed for a period of two years and have shown no recurrence of the degeneration to date (fig. 16).

FIG. 16—(Left) Late keratopathy due to mustard gas. The 8 mm. lamellar graft which has been employed leaves areas of advanced degeneration at the nasal and temporal limbus. (Right) Late keratopathy due to mustard gas. A quadrilateral lamellar transplant placed in the interpalpebral area from limbus to limbus removes practically all of the degenerated cornea.

14. *Recurrent Pterygium*

Magitot[24] reported the use of corneal transplantation in the treatment of recurrent pterygium in 1916. More recently (1950), Paufique[29] recommended the procedure as an excellent measure for malignant or recurrent pterygiums. Maumenee[25] believes that lamellar keratoplasty is a valuable method in the treatment of recurrent pterygium and has devised a technique for applying a half-moon-shaped graft to avoid the slightly larger, round keratoplasty which might be required and which might bring the line of union into the pupillary area. There has been one recurrence in a half-dozen cases. Thomas also mentions the possibility of recurrence of a pterygium after removal by lamellar keratoplasty.

FIG. 17—(Top) Blast injury with aphakia and a large descemetocele. Most of the iris has also been lost. (Center) An 8 mm. lamellar graft for repair of the descemetocele. The outline of the descemetocele could be seen beneath the transparent graft for many months. (Bottom) After twenty-two months the cornea is perfectly transparent. The vision is correctible to 20/30 with a corneal lens.

15. *Descemetocele or Corneal Fistula*

Either a lamellar or a penetrating graft may be used to repair a descemetocele or a perforation. A lamellar graft may be used quite satisfactorily. However, when the descemetocele is prominent, difficulty may be encountered in adjusting the graft closely to the thin underlying recipient bed. It may also be quite difficult to perform the lamellar dissection about the descemetocele without perforating it. Such a perforation, if it is minute, may be compatible with a fairly clear lamellar graft; however, if the perforation is a larger one, there is a protracted edema of the overlying lamellar graft with some opacification and a disappointing visual result. In cases of prominent descemetocele in which the peripheral cornea is transparent and all of the diseased cornea can be encompassed by a graft no more than 8 mm. in diameter, a penetrating reparative transplant has an excellent chance of success with a better visual result. In cases of corneal fistula or perforation in which the anterior chamber is collapsed, it is difficult to perform either a perforating or a lamellar graft. A lamellar graft performed over such a perforation will always remain edematous, although it may succeed in closing the fistula. Frequently a bubble of air may be forced into the anterior chamber through the perforation with a eye dropper, or air may be injected through a small limbal incision. The corneal trephine may then be used to mark out the area of the graft, and the dissection for a penetrating graft may be completed with knife and scissors. In cases in which the peripheral cornea is transparent and a perforation has occurred in a central ulcer such as in chronic herpetic keratitis, the results have been very good, even in those cases in which a number of blood vessels traverse the transparent peripheral cornea. Such vessels may be cut across at the limbus or coagulated with diathermy at the limbus to prevent bleeding into the trephine incision. If all of the diseased cornea can be replaced by a transplant no larger than 8 mm. in diameter, such vessels will remain limited to the line of union and frequently will regress. A descemetocele in an aphakic eye is best treated by lamellar keratoplasty because of the hazard of vitreous prolapse in a penetrating operation (figs. 17, 18, 19).

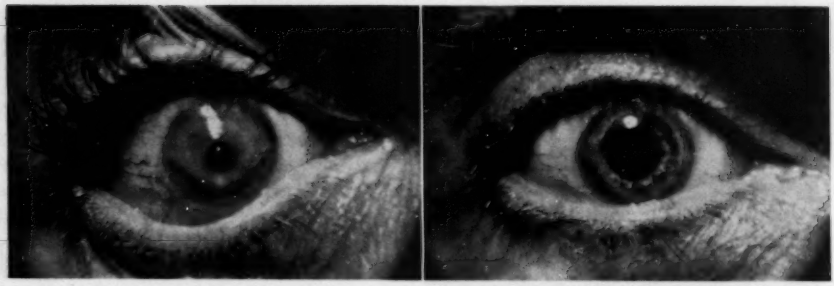

FIG. 18—(Left) Descemetocele protrudes forward 3 mm. in a case of chronic herpetic keratitis of three years' duration. The cornea adjacent to the descemetocele is extremely thin and a lamellar graft presents serious technical difficulties. (Right) An 8 mm. penetrating transplant has been used to excise the descemetocele and the surrounding leukoma. It has been placed slightly eccentrically to remove as much as possible of the thin cornea.

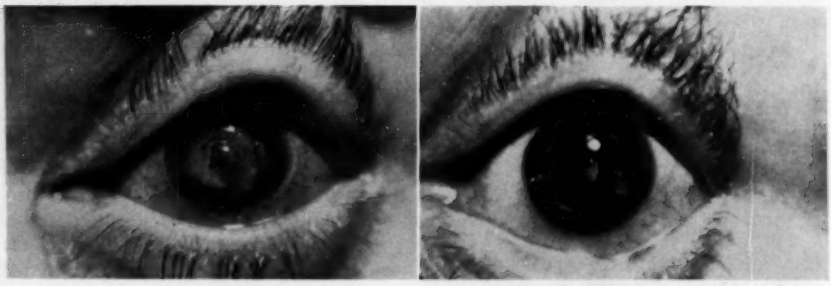

FIG. 19—(Left) Perforated corneal ulcer of two weeks' duration due to pneumococcal infection. The anterior chamber is absent; the iris is incarcerated and there is seclusion of the pupil. (Right) Clear transplant following 8 mm. penetrating keratoplasty, freeing of iris adhesions and iridectomy. There is a complicated cataract which is to be removed. The intraocular tension has remained normal.

CHOICE OF LAMELLAR OR PENETRATING TRANSPLANT IN THERAPEUTIC KERATOPLASTY

It is generally accepted that the visual results of lamellar keratoplasty are in most cases not the equal of those obtained from penetrating grafts, but that the nonpenetrating operation carries a smaller risk, a lesser incidence of complications, and a shorter period of disability. Several other factors may also enter into the decision as to whether a lamellar or a penetrating graft should be utilized. The age and disposition of the patient are extremely important. The increased hazard of a penetrating graft in children is obvious, and a nonpenetrating operation is to be preferred if it will suffice for the particular situation. Keratoplasty in children is generally avoided; when it is undertaken, it is usually in a young child because of the danger of amblyopia or because there has been serious disease or injury of both corneas, leaving the child virtually blind. In those cases in which surgery is undertaken because of the danger of amblyopia, and in which the other eye is normal, a penetrating keratoplasty is almost mandatory if the retinal image is to be clear enough to prevent amblyopia. With present day tech-

niques of direct suturing, such penetrating transplants of 7 mm. or less may be performed in children with little more hazard, if any, than in adults.

The visual acuity of the fellow eye must be taken into consideration in making the decision between a lamellar or a pentrating transplant. If the visual acuity of the fellow eye is good and a lamellar transplant is applicable to the particular condition, the lamellar keratoplasty is to be preferred. On the other hand, if the visual acuity of the fellow eye is poor, one is inclined to lean towards a penetrating keratoplasty in the hope of obtaining greater improvement in vision. The decision, finally, will depend upon the surgeon's careful study of the particular eye and the determination of how favorable the case is for penetrating keratoplasty.

The depth of the corneal opacity is extremely important in the decision for or against lamellar therapeutic keratoplasty. In cases of deep keratitis in which there is biomicroscopic evidence of involvement of the deep stroma, lamellar keratoplasty has been undertaken in the hope that by carrying the lamellar dissection to the plane of Descemet's membrane one might obtain a clear cleavage plane and a transparent corneal graft. More often than not this hope is unfulfilled, and when the dissection is completed, it is found that there is an opacity on Descemet's membrane which cannot be removed further without perforating. This is usually sufficient to reduce visual acuity quite markedly.[2] If a definite transparent zone cannot be observed anterior to Descemet's membrane with the biomicroscope and the case is one which may be treated by penetrating transplant, the penetrating operation is to be preferred.

Marked vascularization of the cornea is considered unfavorable in penetrating keratoplasty and is just as unfavorable, if not more so, in lamellar keratoplasty. If a lamellar graft is placed in a cornea in which there is superficial vascularization, it will be observed that the superficial vessels will dip downward into the line of union and often spread out at the interface of the graft, accompanied by a thin layer of fibrous tissue. Deeper vessels in the stroma which are cut across during a lamellar keratoplasty will behave in a similar manner. This is in contrast to penetrating keratoplasty where, if the graft has been placed in a favorable bed, the severed vessels may spread about the line of union, but may not invade the graft itself. This difference is of particular importance in cases of chronic superficial herpes simplex keratitis limited to the central portion of the cornea, in which either a lamellar or a penetrating graft may be applicable.

TECHNICAL PROBLEMS PECULIAR TO LAMELLAR THERAPEUTIC GRAFTS

Some of the problems occurring in lamellar therapeutic grafts have already been pointed out in the discussion of the various indications for therapeutic grafts, particularly in the repair of a descemetocele or perforation of the cornea. The recipient cornea should always be prepared first in lamellar grafting. Although the donor corneal button may be prepared with various mechanical devices to produce a uniform thickness, the recipient cornea must usually be dissected freehand with a corneal splitter or knife. Occasionally this results in a border which is thicker on one side than on the other, either through accident or because it is discovered that the disease process extends to a deeper layer than expected in some areas. If the recipient has been prepared first, the donor button may then be cut in a similar manner to adapt it to the recipient bed. The complications arising from accidental perforation of Descemet's

membrane in the recipient have already been described and are another reason for performing the dissection of the recipient cornea before the graft is prepared.

If a prominent descemetocele is present, it is advisable to place the corneal trephine over the eye lightly to mark out the area to be dissected before any other manipulation of the eye is attempted. In this way, if the descemetocele should accidentally be ruptured during fixation of the eye, coagulation of vessels, et cetera, one has at least an accurate guide for dissection with knife and scissors.

When a deep lamellar dissection of the recipient cornea has been performed, the thin remaining layer of cornea tends to herniate through the resected area so that the diameter appears larger than that of the graft and the edges appear too shallow. Paracentesis of the anterior chamber after the graft has been placed in position will correct this apparent disproportion. Additional small quantities of aqueous should be released while the sutures are being tied to avoid undue tension.

One of the serious problems peculiar to lamellar keratoplasty is the frequency with which fragments of lint and other foreign particles appear on the interface of the graft and the recipient cornea. The resected surface of the corneal stroma acts almost like fly-paper in attracting particles of lint, and careful examination with a biomicroscope reveals them in a majority of lamellar grafts. One should scrupulously avoid touching the recipient or donor cornea with cotton applicators or any other applicators. The resected layer of recipient tissue should be left in position to prevent settling of lint from the air upon the resected surface. The transfer of the donor button to the recipient should be made as rapidly as possible for the same reasons. If, for any reason, the corneal surface must be flushed with solution, the solution should be obtained from a stoppered bottle used for parenteral administration, and the syringe or irrigator in which it is obtained should be rinsed with the clean solution and then refilled. With all these precautions and with the use of plastic table covers and surgical drapes, lint particles may still be observed under a high percentage of lamellar grafts. If these are situated at the periphery of the graft, they are of no importance; however, when they occur in the visual axis they may reduce visual acuity appreciably.

CONCLUSIONS

Therapeutic corneal transplants have been used in a great variety of corneal diseases with a high degree of success in many of them. The exact percentage of successful results and all the possible indications cannot be established at the present time. The best indications for their use appear to be chronic or recurrent herpes simplex keratitis, indolent corneal ulcers or abscesses which do not respond to other methods of treatment, endothelial-epithelial dystrophy in its early stages, late keratopathy due to mustard gas and similar agents, recurrent pterygium, and descemetocele or corneal fistula. There is no doubt that keratoplasty has added a valuable therapeutic method for the treatment of these serious conditions of the cornea.

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CYCLODIATHERMY WITH SCLERAL FLAP

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and

CLYDE DUVALL, M.D.

BY INVITATION

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ALTHOUGH the methods employed in cyclodiathermy vary considerably, almost all techniques rely upon either penetrating or surface application to the the sclera for their destructive effect upon the anterior uveal tract. Of the two methods of application, penetrating diathermy is less destructive to the sclera, more easily titrated, and more easily performed. However, if the purpose of diathermy is to reduce aqueous flow by partially destroying the anterior uveal tract, then penetrating diathermy may have the possible disadvantage of being less effective, since it induces focal burns of limited size which are spaced relatively far apart. On the contrary, surface diathermy may affect a much greater area of the uvea but it has serious disadvantages. The current must be transmitted through the sclera over an area equal to, or greater than, the tissue being treated. As the sclera has a relatively high impedance, it sustains greater heat damage than the uveal tissue. Furthermore, the fraction of the energy dissipated in the sclera is unknown. This makes standardization of dosage difficult, since there is no exact method of assessing the extent of uveal damage at the time of application. It is the purpose of this paper to present a technique of applying diathermy that partially avoids these objections and to present some histologic data concerning tissue reactions to diathermy by this method.

Presented at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

Much of the surface damage to the sclera can be avoided by first dissecting a flap over the area to be treated and applying diathermy directly upon the underlying tissue. The undamaged flap may then be resutured over the treated area. The sclera is exposed by an incision in the conjunctiva and in Tenon's capsule approximately 6 mm. behind and parallel to the limbus. An incision is made in the sclera anterior to the insertion of the recti muscles and parallel to the limbus. In our procedures, the scleral incisions have usually extended about one third the circumference of the globe. The incisions are then angled forward and terminated at the limbus. A flap, approximately four fifths the thickness of the sclera, is dissected and reflected forward (fig. 1). The exposed area is dried with sponges, and diathermy is applied to the surface. We have used a rod electrode with a flat circular surface 1 mm. in diameter and have employed a vacuum-tube-generated current with the machine setting at the minimum which will produce heat reaction (fig. 2). The electrode is applied intermittently until a light brown char is obtained (fig. 3). Excessive burn is not unusual, since it is impossible to control dosage adequately. A significant shrinkage of the globe usually occurs, and there is a concomitant temporary increase in intraocular pressure. The pressure may be reduced by two or three penetrating punctures placed through the burned area to re-

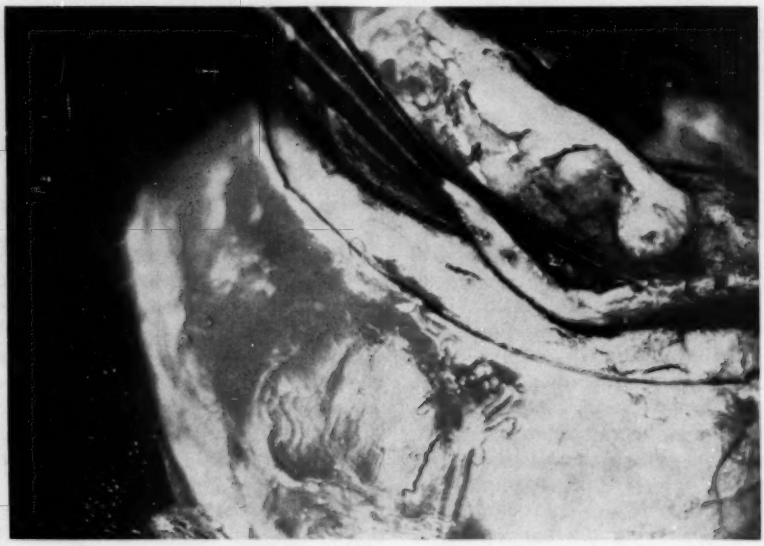

FIG. 1—Scleral flap partially dissected over the ciliary body. Note line of incision immediately in front of superior rectus muscle.

FIG. 2—The flap is fully dissected and electrode is placed in position for first application.

FIG. 3—Central area where diathermy has been applied.

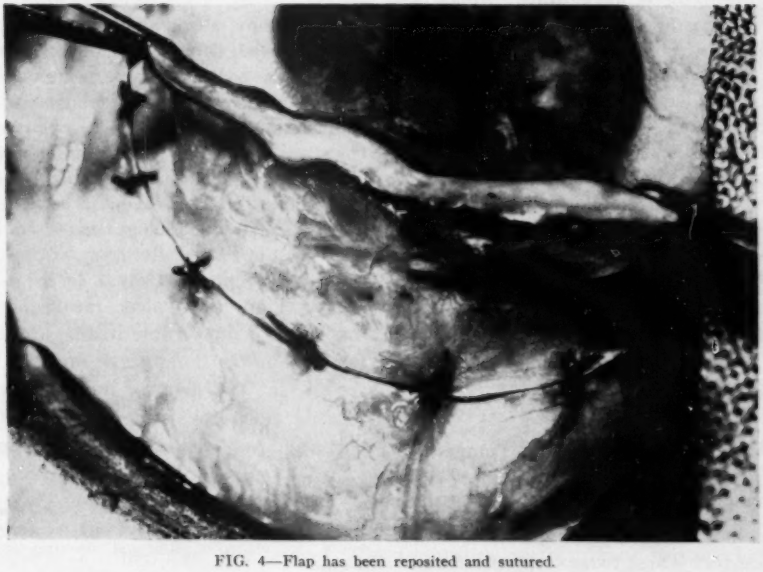

FIG. 4—Flap has been reposited and sutured.

lease aqueous from the posterior chamber. The flap is then reposited and sutured with interrupted chromic or silk suture and the conjunctiva closed with continuous 6-0 silk (fig. 4). The patient is returned to bed but is usually permitted to be up the following day.

For the past two years this method has been employed only when the ocular tension could not be controlled with medical therapy and when the standard surgical procedures offered a very poor prognosis. These criteria have limited use of the operation to a small number of eyes, most of them aphakic. In seven eyes with aphakic glaucoma, vitreous had been lost at the time of the lens extraction and partial or complete closure of the chamber angle had occurred from fibrous connective tissue overgrowth or by anterior iris synechias. A hammock pupil was also present in most instances. Three of the treated eyes developed an increase in ocular tension after cyclodiathermy, but tension is presently controlled with miotic therapy. One eye has required three procedures which involved treatment of the entire ciliary body. The remaining four have been under observation for eight months to two years and have maintained a normal tension without additional medication. In three aphakic, glaucomatous eyes of the open angle type, a normal tension has been maintained following one surgical procedure. These three have been observed for less than one year. In an eye with glaucoma secondary to occlusion of the central retinal vein, the initial drop was followed by a rise to preoperative levels within six months. However, the patient has been able to retain the eye and has remained comfortable.

With two exceptions the immediate postoperative course has been uneventful. The ocular media has remained clear and the patients have experienced little discomfort. These two exceptions showed a vitreous haze and visible beam in the anterior chamber within a week of the surgical procedure, and in one of these the visual acuity has remained depressed for the past four months. However, in all eyes a subconjunctival and episcleral hyperemia has persisted for weeks after the surgical procedure. No atrophi bulbi, ectasias, or staphylomas of the globe have been observed. However, in one patient with a persistently elevated tension, uveal tissue became visible along the suture line.

Hypothetically, cyclodiathermy may function by partially destroying the anterior uvea, particularly the ciliary body, and thus reducing the rate of aqueous formation. However, there is some evidence that penetrating diathermy may function by permitting filtration of aqueous through burned tissue.[3] In order to assess the effect of diathermy damage by this technique, the operation was performed upon eyes that were to be enucleated for other purposes, and microscopic sections were made through the treated areas. These globes were then processed by a method previously described which demonstrates heat damage to collagen tissues at temperatures as low as 70 degrees centigrade.[1,4,5] Essentially this consisted of fixing the globes in Carnoy's solution and subsequently staining the sections with orange G and aniline blue, or by the Gömöri's trichome technique. In the globes treated in this manner, the tissue alteration to the diathermy current was found to be much greater than anticipated. Heat damage was often demonstrable in the sclera as far back as the optic nerve (fig. 5). As shown in the figure, the diathermy spreads along the plane of the treated sclera and remains limited to this plane.*

*In normal eyes this same plane will show a similar spotty staining reaction but not with the same intensity, uniformity, or structural alteration in the lamellae.

The plane of sclera corresponding to the dissected flap is unaffected. The scleral fibers had undergone necrosis in the area where the diathermy electrode had been directly applied. The affected scleral fibers away from the burn showed some swelling and separation but no other significant changes except for the staining reaction. The heat alteration noted in the sclera beyond the point of direct application appears to be reversible. In an eye obtained six weeks after application of diathermy under a flap for retinal detachment, the demonstrable burn was largely limited to the area of direct application.

The tissue reactions observed with surface diathermy differ from the focal penetrating burns obtained with a small electrode and a higher current intensity. With focal burns the tissue reaction appears to be limited to a discrete area immediately surrounding the point of penetration (fig. 6).

The effects upon the ciliary body and choroid were difficult to assess. Obviously, the more superficial tissues of the ciliary body immediately underlying the burned area were altered by heat. The deeper tissues which lie beneath the pigment and nonpigment epithelium showed no indication of damage. Unfortunately, we have been unable to find a sensitive staining method for studying heat damage to muscle or vascular tissues in the ciliary body and choroid (fig. 7).

DISCUSSION

Since the number of eyes selected for this operative procedure was limited, no conclusions can be made concerning the efficacy of surface diathermy for the treatment of glaucoma. However, it is both clinically and histologically apparent that the scleral flap and the plane of sclera corresponding to this flap are undamaged by heat, which is a desirable feature. Furthermore, the globes that have been subjected to the procedure have tolerated it quite well and control of ocular tension has been obtained when no other means offered promise. The means by which cyclodiathermy reduces ocular tension remain undetermined. A lowered tension cannot be explained on the basis of filtration of fluid through diathermy punctures, since all punctures are sealed by an intact scleral flap. It seems most logical that relatively severe damage occurs to the ciliary body and anterior choroid despite our inability to demonstrate it histologically. The spreading effect noted in the scleral tissue most likely occurs in the uveal tract as well. However, in the uveal tract the heat may be dissipated so rapidly that little or no tissue damage occurs. On the other hand, reduction in tension might be due to damage to both the choroid and ciliary body. The observation has been made that ocular tension is reduced following diathermy treatment for retinal detachment. In this situation, heat damage may extend from the choroid to the ciliary body in the manner described above. Transmission of diathermy current along the choroid may explain hemorrhages and retinal damage (macula) that are observed in areas remote from the point of application in retinal detachment surgery.[2,6]

CONCLUSION

A technique of cyclodiathermy has been presented which minimizes undesirable damage to the globe from surface diathermy current and seems to offer a means of controlling ocular tension in globes not amenable to other surgical procedures or medical therapy. Microscopic studies of eyes enucleated after this technique reveal that diathermy current may cause heat alteration far beyond the point of application. The significance of this "heat spread" has not

been determined but it may warrant further investigation in relation to surgery for retinal detachment.

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DISCUSSION

CLARENCE H. ALBAUGH, M.D., Los Angeles: This work of Drs. Christensen and DuVall has provided ophthalmologists with a new modification of the cyclodiathermy operation. Furthermore, it has stimulated consideration of the basic mechanism of action in this type of surgery. It has also provided a most interesting observation on the spreading effect of a specific diathermy current used with surface application.

To be specific, I hope that Drs. Christensen and DuVall will expand their indications for the cyclodiathermy operation. It has a special advantage in late open angle glaucoma and in secondary glaucoma which cannot be controlled medically. In the secondary glaucoma, it is particularly useful in minimizing the risk of sympathetic ophthalmia, which appears not infrequently with the ordinary types of surgery. Cyclodiathermy is the operation of choice, of course, in hemorrhagic glaucoma, and this modification which Drs. Christensen and DuVall have presented should be particularly appropriate for this type of disease. Even in those cases in which the tension is not completely controlled, pain, at least, disappears. There is not the danger of superimposing hemorrhagic glaucoma upon an already existing hemorrhagic glaucoma, which so commonly follows operations involving opening of the globe.

Drs. Christensen and DuVall have taken one more step in the elucidation of the mechanism of action of this type of surgery, although, as they admit, the final answer is still not at hand.

I believe that I shall still employ penetrating cyclodiathermy for most cases. It is simpler; it can even be done in the office. Apparently the postoperative reaction is less, and the greatest advantage of all is that it can be graduated by easy repetition, as necessary.

I am particularly pleased with the report on spreading effects of high frequency current in ocular tissues. Very little is known about this subject; yet it is of the utmost importance. In this phase of electronics, medicine is still in the early Dark Ages. I hope that Drs. Christensen and DuVall will continue this line of research. It will be interesting to hear of the effects of variations in frequency, wave form, and voltage. Drs. Christensen and DuVall are to be commended for the work leading to this report.

GRAHAM CLARK, M.D., New York: It is a great pleasure to have an opportunity to

FIG. 5—Yellow inner plane of sclera from ciliary body to nerve head. This plane represents scleral tissue altered by heat generated from diathermy.

FIG. 6—Sclera treated by focal diathermy burns. The heat-altered sclera is represented by the yellow staining areas. The tissue reaction is limited to a discrete area surrounding the point of application.

FIG. 7—Demonstrable change in ciliary body is characterized by paler blue staining in tissue adjacent to the burned sclera. Deeper tissues appear unaffected.

FIGURE 5.

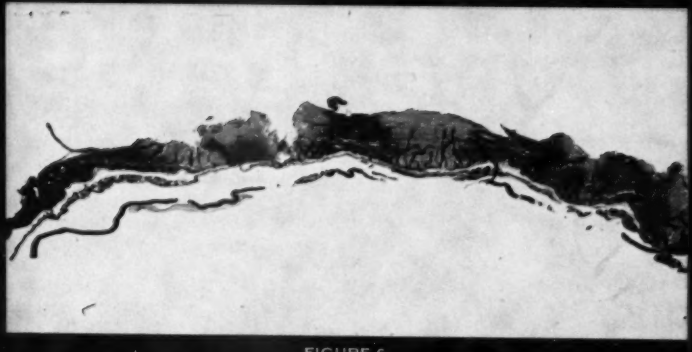

FIGURE 6.

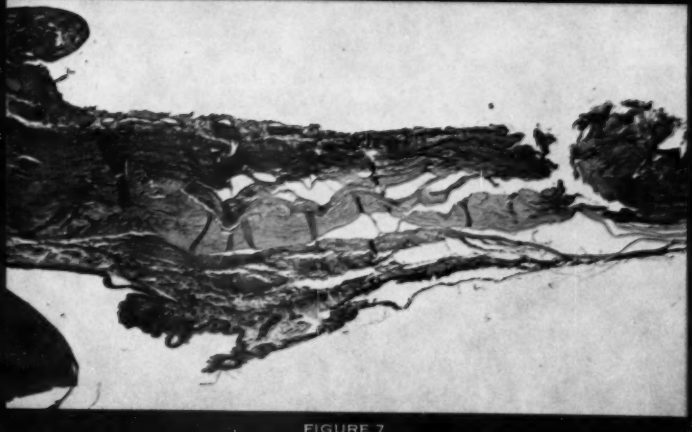

FIGURE 7

discuss this paper and to voice appreciation of the continuance of Dr. Christensen's very important study of the effect of high frequency currents on ocular tissues.

Quite a number of years ago, while Dr. Christensen was in the operating room with me, a casual question of his began our studies in the same field. It is most interesting that without any intercorrespondence, we have arrived at a very similar mode of attacking two different diseases. At the Presbyterian Hospital we have attacked the problem of applying diathermy in the treatment of retinal detachments by much this same method, namely, subscleral diathermy. We have used minimum current with minimum damage and have obtained maximum effect and more predictable results.

As Dr. Christensen pointed out, the sclera has not only a high but also an inconstant and completely unpredictable impedance. At one point it will offer practically no resistance to the flow of the current, and at another point it can stop the flow entirely. Therefore, it is wise to move the sclera aside when treating the tissue beneath it.

Penetrating diathermy, as Dr. Albaugh has brought out, has the convenience of being applicable in small doses. As he mentioned, it can be done as an office procedure in the treatment of glaucoma and it can be fractionated into small, and very often convenient, packages for the careful control of the tension. However, it has a great disadvantage in that it destroys a great deal of tissue at the center of the treatment area and has very little effect at the periphery; therefore, it leaves a rather spotty area of treatment. I believe this fault is more important in the treatment of retinal detachments than it is in the treatment of glaucoma, but it is important in the treatment of both conditions.

There has been, in the past, advocation of penetrating diathermy applied to the region of the ciliary body by electrodes for ten seconds. From our studies I can assure you that this is not only unnecessary but rather fruitless, as the coagulant around the tip of the diathermy will shut off your current in about two seconds. The rest of the time is completely wasted effort.

I find the application of subscleral diathermy on the ciliary body most interesting because it shows no demonstrable effect; yet, clinical observation shows effects toward the regulation of the intraocular pressure. If this effect were not microscopic, it would be interesting to examine some of this tissue by the electron microscope in order to determine the effect of cyclodiathermy. As the authors have brought out here, this has never yet been determined. Perhaps the changes are within the cell architecture rather than due to the simple destruction of cells.

In many of our detachment cases which required reoperation because of failure, an ease of cleavage was noticeable when reopening the previously exposed site of diathermy. In other words, there was rather poor healing between the lamellae. The healing was between the edges of the wound. If cyclodiathermy perforations were made at the site, perhaps some drainage would result through filtration.

I think that this method, while perhaps not as convenient as the perforating, certainly makes a safer and a more rational application of diathermy currents in the treatment of other disease. As Dr. Albaugh has brought out, certainly we need to be more rational in our use of these highly dangerous, highly potent, powerful forces of electricity within the eye. We too often apply them without knowledge of what they may do. He might even move his date back. The instruments that most of us are using actually bear the discovery date of 1892. This is not what I call modern instrumentation. I think that we need to do a great deal more examination, as Dr. Christensen is doing, to employ the best of our present-day knowledge for the benefit of our patients.

WAARDENBURG'S SYNDROME

A syndrome of heterochromia of the irides, lateral displacement of the medial canthi and lacrimal puncta, congenital deafness, and other characteristic associated defects

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WAARDENBURG,[19] a Dutch ophthalmologist, first pointed out in 1950 that certain developmental anomalies of the eyelids, eyebrows, and nose root may occur in association with pigmentary defects of the irides and head hair and with congenital deafness as a genetically determined syndrome. Although the individual components of this new syndrome had been described previously, their associated occurrence in the same individual had escaped prior recognition.

The principal characteristics of the syndrome as described by Waardenburg are: (1) lateral displacement of the medial canthi of the eyes and of the inferior lacrimal puncta, (2) a broad, prominent root of the nose, (3) hyperplasia of the medial portions of the eyebrows, (4) white or gray forelock, (5) partial or total heterochromia of the irides, and (6) deaf-mutism.

In 1951 Waardenburg[20] reported an extensive clinical and genetic study of the new syndrome and included a survey of the literature relative to the occurrence of the anomalies, separately and combined, in man and in other animals. From a study of sixteen family pedigrees, he concluded that the syndrome has an autosomal dominant inheritance with variable penetrance of the individual components. He estimated that individuals with this syndrome constituted approximately 1.43 per cent of all congenitally deaf persons in the Netherlands and that the incidence of the syndrome as a whole (with or without deafness) was approximately one person in 42,000 in the general population. This report appeared in a journal of genetics and, thus, may not have obtained adequate recognition by pediatricians, ophthalmologists, otologists, and others.

Since Waardenburg's initial delineation of the syndrome there have been but few additional reports and none in the American literature. Keizer[10] described another Dutch family in 1952 and Wildervanck[24] reported 5 additional Dutch cases in 1957. In 1958 Mc-

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Kenzie,[14] apparently unaware of Waardenburg's report, described a 4-year-old boy whose family pedigree showed 5 affected individuals in three generations. Partington,[16] in 1959, described an English family in which 5 members of four generations showed various components of the syndrome. In the same year, Fisch[4] reported the first histologic examination of the inner ear in this disorder. In this report he also summarized his observations of 35 affected individuals but illustrated only three family pedigrees, one of which (pedigree no. 2) appears to be the same as that reported by McKenzie.[14]

It is the purpose of this paper to present our experience with this disorder in a group of subjects, to include the first reported instances in the Negro race, and to consider the potential contribution of the syndrome to the clarification of the pathogenesis of certain types of congenital deafness.

HISTORICAL BACKGROUND

In 1947 Waardenburg was consulted by an elderly, deaf-mute tailor with chronic tearing and progressive impairment of vision. The features of the physical examination which most interested Waardenburg were the lateral displacement of the medial canthi of the eyes and of the inferior lacrimal puncta. Van der Hoeve,[18] in 1916, had first described these anomalies in 14-year-old, monozygotic twin girls who were deaf-mutes. Waardenburg's awareness of Van der Hoeve's original description caused him to wonder, "Could it be pure chance that three deaf-mutes in our country should display this rare abnormality of the eyelids?" Upon presentation of the case to the Netherlands Ophthalmological Society in 1947, Goedbloed, an oculist at The Hague, showed Waardenburg another instance of the combination of deaf-mutism and lateral displacement of the medial canthi.[21] At about this time Waardenburg noted a photograph of a brother and sister who were described as having hypertelorism in Walsh's textbook, *Clinical Neuro-ophthalmology*.[23] The girl was totally deaf, the boy had impaired hearing, and both had white forelocks. The eye abnormality seemed to Waardenburg to be more characteristic of his syndrome than of hypertelorism in that the outer canthal distances appeared to be normal. In 1948, Waardenburg observed a 10-year-old girl, studied by Klein[11] in Geneva, who showed severe lateral displacement of the medial canthi, deaf-mutism, a white forelock, marked vitiligo, and other skeletal anomalies. It was the association of deaf-mutism and lateral displacement of the medial canthi in these four Dutch, two American, and one Swiss case that led Waardenburg to undertake a study of the inmates at five Dutch institutions for the deaf. He examined a total of 1,050 patients and found 13 with the eyelid anomaly. These individuals became the probands of the family investigations. It is interesting that it was not the more striking features of the disorder such as heterochromia or white forelock but the more subtle (and fortunately most common) defect of lateral displacement of the canthi that led to the delineation of the syndrome.

Our interest in this disorder was aroused in 1956 when we examined a 6-year-old, Negro girl in the Out-Patient Department of St. Christopher's Hospital for Children prior to her admission to the Pennsylvania School for the Deaf. This child presented an arresting appearance because of an unusual light blue color of the irides. The medial portions of the eyebrows were gray. Her mother had a light blue iris on the left and a white forelock (fig. 2). It was learned that a half brother of the patient was a student at the Pennsyl-

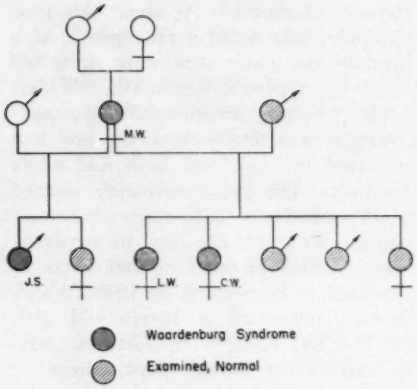

FIG. 1—Pedigree of family of L. W. and J. S. (Cases 1 and 2).

vania School for the Deaf and also had blue eyes (fig. 3). We were unaware at this time of Waardenburg's report, but when these findings were described to Dr. Victor C. Vaughan, III, he cited Waardenburg's studies. Two months later a 4-year-old Negro boy was seen in the Out-Patient Department for evaluation of a suspected defect of hearing. This child also had one blue iris. He had a serious impairment of hearing.

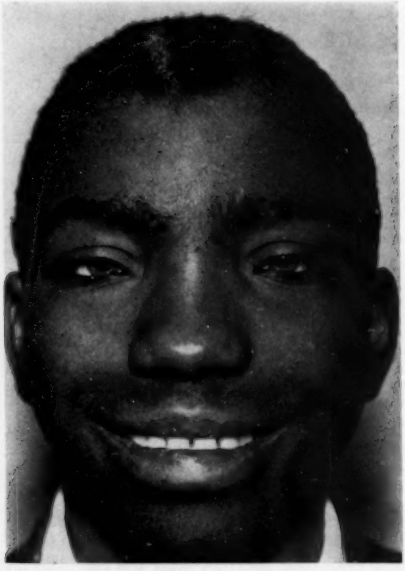

FIG. 3—J. S. Irides pale blue. Definite white forelock. Bilateral, profound loss of hearing.

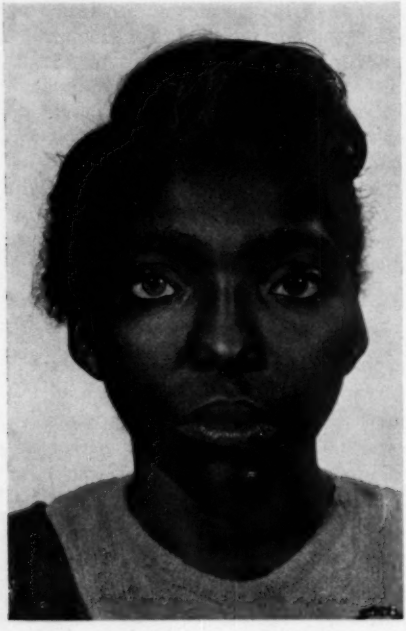

FIG. 2—M. W., mother of cases 1 and 2. Right iris pale blue with limbal rim of brown pigment. Left iris normally pigmented. Definite white forelock. Normal hearing.

Following our initial observations, we described the syndrome to Mr. John Nace, Director of the Pennsylvania School for the Deaf. He and his teaching staff subsequently assembled a group of approximately 20 students who were either typical of or suspicious for the disorder. Upon detailed examination of these individuals, we found 6 instances

of the syndrome.[3,15] Unlike Waardenburg, we did not personally examine all of the students at this school; thus some cases may have escaped detection.

CLINICAL OBSERVATIONS AND PEDIGREES OF PROBANDS AND AFFECTED FAMILY MEMBERS

FIG. 4—L. W. Medial portions of the eyebrows are white. Irides bilaterally blue. Bilateral, profound loss of hearing.

Case 1

L. W., a 6-year-old Negro female, was examined in the Out-Patient Department of St. Christopher's Hospital for Children on June 19, 1956, prior to admission to the Pennsylvania School for the Deaf (fig. 4). This child was known to be deaf and to have had excessive tearing, more marked on the right, since birth.

FIG. 5—C. W. Bilateral, pale blue irides. Unilateral, profound loss of hearing.

Physical examination revealed a hyperplastic, broad nasal root and medial hyperplasia of the eyebrows with some white hairs present in the area. There was no white forelock. Scattered depigmented areas of the skin on both arms were noted. Both irides were pale blue and a heavy, brown pigment deposit was present about the limbi (fig. 6). The inner canthal distance was 40 mm., interpupillary distance 54 mm., and the outer canthal distance 85 mm. The lacrimal puncta were small and displaced laterally 5 mm. from the medial canthi. There was fine pigment mottling at the periphery of the fundus. Slit lamp examination revealed the stroma of the irides to be thin and filamentous.

Audiometric testing disclosed a profound, perceptive loss of hearing bilaterally (fig. 7).

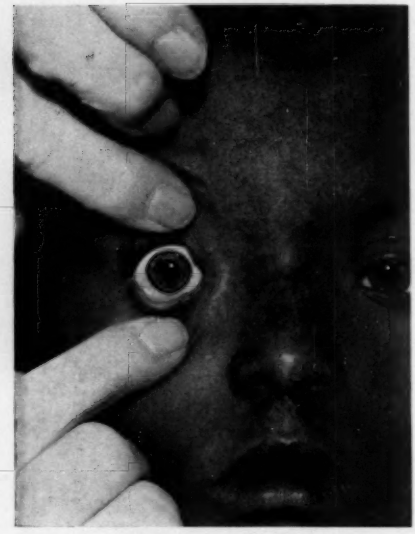

FIG. 6—L. W. Pale blue iris with brown pigment deposit at the limbus. In Negro children this pigment deposition is normally obscured by the dark iris.

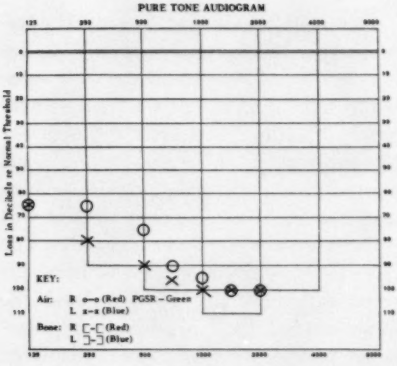

FIG. 7—Audiogram of L. W. showing profound, perceptive loss of hearing bilaterally.

Case 2

J. S., a 14-year-old Negro male student at the Pennsylvania School for the Deaf, has known congenital deafness (fig. 3). He is the half-brother of L. W., having the same mother but a different father (fig. 1).

Physical examination revealed a striking gray forelock in the midline, a hyperplastic, broad nasal root, and medial hyperplasia of the eyebrows. The inner canthal distance was 48 mm., interpupillary distance 68 mm., and the outer canthal distance 98 mm. The inferior lacrimal puncta were 3 mm. from the medial canthi and 1 mm. inside the limbi. The irides were isochromic and of a striking pale blue color. Under slit lamp examination the iris frill was 2.5 to 3 mm. from the pupillary margin and the stromal surface appeared atrophic. The limbal areas were well pigmented. There was fine pigment mottling at the periphery of the fundi.

Audiometric examination revealed a profound, bilateral perceptive loss of hearing.

Family History. M. W., the mother of cases 1 and 2, has most of the signs of the syndrome. She had 2 children by her first husband, one of whom is affected (J. S., case 2) and 4 children from her second marriage, 2 of whom are affected (L. W., case 1, and C. W.). The mother is acquainted with three brothers and one sister of her first husband, and with three brothers and three sisters of her second husband. She also knows her own mother, father, three brothers, two sisters, a maternal uncle, two maternal aunts, four paternal uncles, three paternal aunts, her maternal grandmother and grandfather. One sister about whom little was known died. These relatives have not been examined by us but by history none were deaf, had gray forelocks, blue irides, or other ocular abnormalities.

Affected family members. M. W. has heterochromia. The iris of the right eye is pale blue with a limbal rim of brown pigment (fig. 2). Ophthalmoscopic examination disclosed a normal, Negroid

fundus on the left and pigment mottling on the right. The inner canthal distance was 45 mm., the interpupillary distance 70 mm., and the outer canthal distance 100 mm. The inferior lacrimal puncta were displaced 6 mm. from the medial canthi. The medial portions of the eyebrows were hypertrophic and gray and there was a definite white forelock. Audiometric examination revealed normal hearing.

C. W., a 7-year-old daughter, was living with relatives in North Carolina at the time of our initial studies (fig. 5). Some impairment of auditory acuity had been suspected by the mother. Through the cooperation of the school health authorities, audiometric testing was performed, revealing a profound, unilateral loss of hearing on the left. The child recently returned to live with the mother and has since been examined by us. Both irides were light blue in color. There was lateral displacement of the medial canthi and lacrimal puncta. The inner canthal distance was 45 mm., interpupillary distance 52 mm., and outer canthal distance 80 mm. The inferior lacrimal puncta were 6 mm. from the medial canthal borders and situated inside the limbi. The left fundus was completely normal. There was no white forelock. Audiometric testing revealed a profound loss of hearing of the perceptive type on the right, and normal hearing on the left.

Comment. The transmission of the syndrome in this family is obviously through the mother. In addition to showing all of the manifestations of the disorder, with the exception of deafness, she has had affected offspring from each of two marriages with unaffected husbands. Although none of the relatives could be examined, the absence of any other known affected family members suggests that the occurrence of the syndrome in the mother represents a new mutation. A significant observation in this family is the presence of isochromic, light blue irides in 3 affected individuals. This finding constitutes the strongest evidence recorded that lack of heterochromia does not eliminate the possibility that the irides are affected when they are both blue. Of additional interest is the presence of pigment mottling of the fundi of all of the eyes with blue irides with the exception of the right fundus of C. W. This observation lends support to the hypothesis that involvement of the fundal pigment may occur as part of the syndrome. The demonstration of unilateral, profound loss of hearing in association with other features of the syndrome indicates that this type of unilateral loss results from the genetic disorder occurring in the syndrome.

Case 3

H. M., a 2-year-old Negro male, was brought to the Out-Patient Department

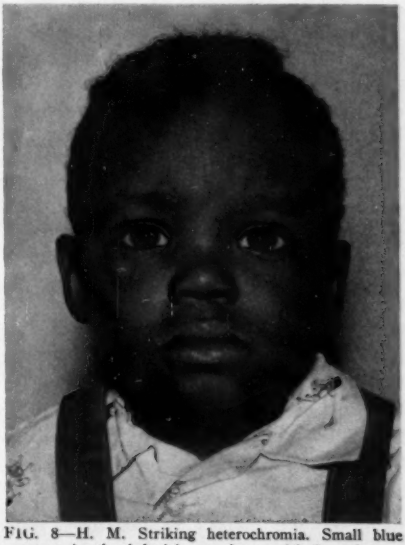

FIG. 8—H. M. Striking heterochromia. Small blue segment in the left iris at eleven o'clock and completely blue iris on the right. Profound loss of hearing bilaterally.

on Aug. 27, 1956, because the grandmother felt that the child could not hear normally (fig. 8). According to the mother, the color of the right iris changed from brown to blue at 2 weeks of age.

Physical examination revealed a well-developed child who did not respond to spoken words or noises. There was a broad, high nasal root and medial hyperplasia of the eyebrows but no white forelock. The inner canthal distance was 32 mm., interpupillary distance 53 mm., and the outer canthal distance 83 mm. The inferior lacrimal puncta were displaced 5 mm. laterally. The left iris was brown with a small area of blue in the upper medial quadrants. The right iris was light blue in color and flattening of the stroma was revealed by slit lamp examination. There was diffuse pigment mottling of the retinas bilaterally.

Audiometric testing by psychogalvanic skin response revealed a loss of 75 to 80 decibels in both the right and the left ear, at 250 cycles per second; 80 db. at 500 cycles per second; and loss greater than 100 db. at all other frequencies. More recent testing by pure tone audiometry has confirmed the findings of bilateral, profound loss of hearing.

Family history. The proband has no siblings and neither parent has any of the characteristics of the syndrome.

The mother has 3 normal sisters; one brother died in infancy of unknown cause. None of these siblings are said to have had any of the manifestations of this syndrome, nor is there any suggestion of its presence in the maternal grandmother, grandfather, or any other maternal relatives.

The father is an only child and there is no known history of deafness, blue irides, or white forelock among his relatives.

It seems highly probable that the proband represents a sporadic mutation.

Case 4

G. R. is a congenitally deaf, 15-year-old, white female student at the Pennsylvania School for the Deaf (fig. 9).

FIG. 9—G. R. Few strands of white hair, broad nasal root, displacement of the lateral canthi, and inferior lacrimal puncta.

Physical examination revealed a well-developed child with a few strands of white hair in the forelock, a broad nasal root, medial hypertrophy of the eyebrows, and vitiliginous changes of the abdominal skin and of the right lower leg. The inner canthal distance was 44 mm., interpupillary distance 60 mm., and outer canthal distance 87 mm. The inferior lacrimal puncta were 4 mm. from the medial canthi and 2 mm. inside the limbi. Both irides were very light blue. Slit lamp examination revealed retraction of the iris collarette, hypoplasia of the anterior border layer and stroma,

and flattening of the iris pattern. There was fine pigment mottling at the periphery of the fundi which presented a tessellated appearance. Audiometric testing revealed bilateral, profound, perceptive loss of hearing.

Family history. The proband is an only child and there is no known deafness in the kinship. None of the family members have been examined to date, however.

Case 5

B. M., a 4-year-old white female student at the Pennsylvania School for the Deaf, was known to be congenitally deaf.

Physical examination revealed a child of normal size for her age. There was no definite white forelock with the exception of a few light hairs in the midline. There was a broad nasal root and mild, medial hypertrophy of the eyebrows which met in the midline. The inner canthal distance was 38 mm., interpupillary distance 54 mm., and outer canthal distance 80 mm. The inferior lacrimal puncta were 4 mm. from the medial canthi and the right nasolacrimal duct was obstructed. The irides were isochromic, of brown color, and appeared normal under slit lamp examination. There was fine pigment mottling at the periphery of the fundi. Reliable audiometric testing could not be obtained because of the apprehension of the child but it appears clinically obvious that she has a bilateral profound loss of hearing.

Family history. Detailed study of other members of this family has not yet been undertaken but some information is available by history. The patient's mother is congenitally deaf and has "very blue eyes." She had brown hair which changed to pure white early in life. The mother has 4 siblings, none of whom are deaf, nor is there any other known deafness among her relatives. The father is also deaf. One of his 3 siblings is deaf and is the father of a deaf child who was examined by us and does not have the syndrome. The father's sister has 2 children, one of whom is partially deaf. This child was seen in our Out-Patient Department for hearing evaluation at a time when we were unaware of any relationship of this child to the M. family. It was inadvertently noted that the father of the child had a white forelock but no other obvious characteristic of the syndrome. The paternal grandparents of the child are both deaf.

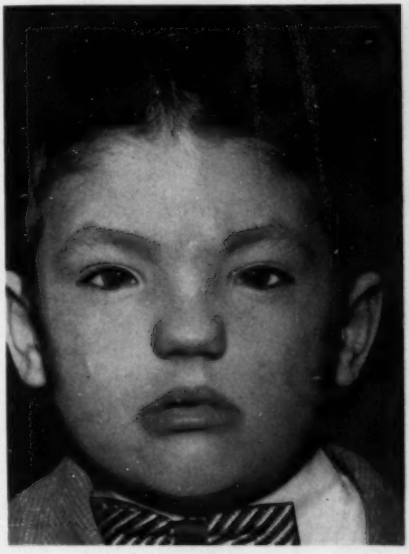

FIG. 10—G. W. Congenital deafness. Note widened inner canthal distance and appearance of mouth.

Case 6

G. W. is a 7-year-old white male student at the Pennsylvania School for the Deaf who has been known to be deaf since birth (fig. 10).

Physical examination revealed a normally developed boy with a gray forelock, a broad nasal root, and medial

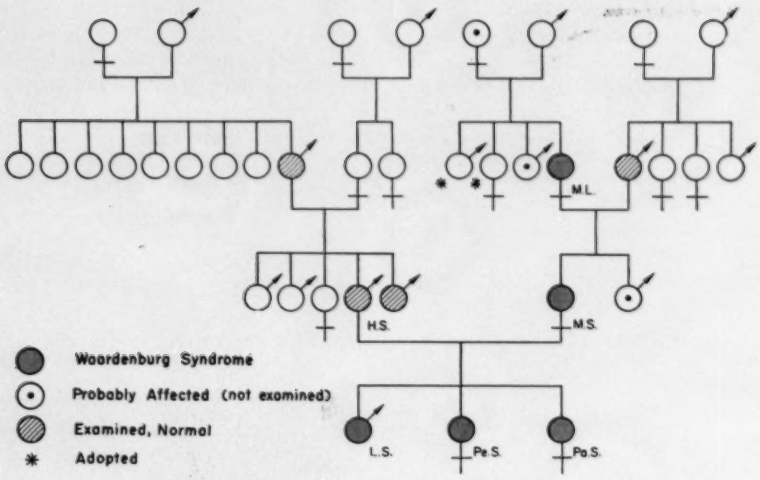

FIG. 11—Family pedigree of L. S. (Case 7).

hypertrophy of the eyebrows. The inner canthal distance was 40 mm., interpupillary distance 54 mm., and outer canthal distance 85 mm. The inferior lacrimal puncta were 4 mm. from the medial canthi and 1 mm. inside the corneal margins. The irides were isochromic and very pale blue. Under slit lamp examination the anterior border layer of the irides appeared thin and the stroma was filamentous and definitely hypoplastic. The fundi revealed very fine pigment mottling at the periphery. Audiometric examination revealed a profound, bilateral, perceptive loss of hearing.

Family history. This child was born out of wedlock. Nothing is known of the father or his family. There is no known deafness or other evidence of the syndrome in the mother or in any known member of her family. She has refused to participate in any further studies.

Case 7

L. S. is a 10-year-old, congenitally deaf, white male student at the Pennsylvania School for the Deaf.

Physical examination revealed a well-developed boy for his chronological age. There was a prominent gray forelock, a high, broad nasal root, and medial hyperplasia of the eyebrows (fig. 14). The inner canthal distance was 40 mm., the interpupillary distance 58 mm., and the outer canthal distance 90 mm. The inferior puncta were placed 4 mm. from the inner canthi and 1 mm. inside the limbi. The irides were isochromic and pale blue with bilateral loss of stroma and flattening of the iris pattern revealed by slit lamp examination. There was a fine pigment mottling in the periphery of the fundus. Many brown nevi were noted on the torso but there were no depigmented areas.

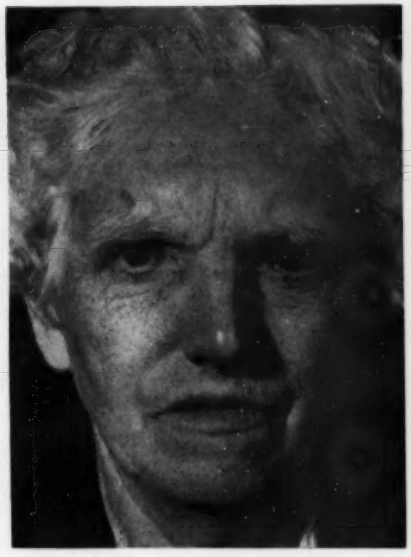

FIG. 12—M. L. Maternal grandmother of case 7. Hair allegedly became suddenly and completely white at 40 years of age. Right iris completely blue, left iris is blue in lower half and brown in upper half.

FIG. 13—M. S. Mother of case 7. Bilateral pale blue irides. Note plucked eyebrows and dystopia of medial canthi.

Audiometric examination revealed a profound, perceptive type loss of hearing.

Family history. The pedigree of this child's family is shown in figure 11. There was no evidence that the syndrome was present in any member of the paternal side of the family.

The syndrome was present with varying degrees of expression in 2 female siblings, the mother and maternal grandmother of the child. Although no other relatives were known to be deaf, the maternal grandmother commented that "most of her relatives had very strikingly blue eyes."

Affected family members. Pe. S., a 5-year-old female, had medial hyperplasia of the eyebrows and a broad nasal root but no white forelock (fig. 15). The inner canthal distance was 40 mm., the

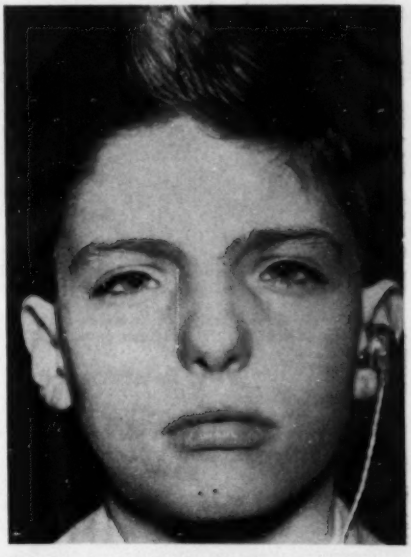

FIG. 14—L. S. Case 7. Prominent gray forelock. Irides isochromic and pale blue. Similarity of facial appearance including nose and mouth of all patients is remarkable.

interpupillary distance 56 mm., and the outer canthal distance 80 mm. The inferior lacrimal puncta were situated inside the limbal borders. The irides were light blue and isochromic. The fundi revealed marked pigment mottling bilaterally. There were vitiliginous areas of the skin of the right wrist.

The parents had suspected that this child's hearing was not normal and audiometric testing revealed a unilateral, profound, perceptive loss of hearing (fig. 17).

FIG. 16—Pa. S. Isochromatic, pale blue irides. Inner canthal distance 40 mm. at 1 year of age.

FIG. 15—Pe. S. Bilateral, pale blue irides and unilateral loss of hearing. Widened inner canthal distance gives appearance of strabismus.

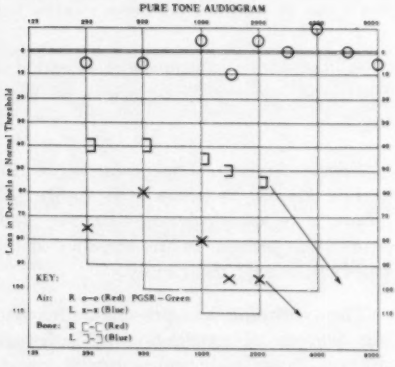

FIG. 17—Audiogram of Pe. S. showing unilateral, profound loss of hearing.

Pa. S., white female 1 year of age, had medial hyperplasia of the eyebrows, a broad nasal root, but no white forelock (fig. 16). The inner canthal distance was 40 mm. and the inferior lacrimal puncta were situated within the limbal margins. The irides were isochromic and of the same blue color noted in the proband. Slit lamp and funduscopic examination and audiometric testing were not performed. There was no clinical evidence of impaired hearing.

M. S., mother of the child, had a white forelock, a broad nasal root, and medial hypertrophy of the eyebrows. (This is not noticeable in the photograph

as the eyebrows were plucked for cosmetic purposes [fig. 13]). The irides were isochromic and of the same blue color as in the proband. Examination of the fundi revealed pigmentary mottling. Slit lamp examination was not performed. The inner canthal distance was 44 mm., interpupillary distance 64 mm., and outer canthal distance 90 mm. The inferior puncta were laterally displaced and situated inside the limbal margins. Areas of vitiligo of the skin of the dorsal surfaces of both wrists were noted but complete examination of the skin was not performed. Audiometric testing revealed an essentially normal pattern.

M. L., the maternal grandmother, had black hair and a white forelock in her younger years (fig. 12). At the age of 40, her hair was said to have turned completely white within a period of one week. She had a broad, high nasal root and medial hyperplasia of the eyebrows which were completely white and met in the midline. There was partial heterochromia with a completely blue right iris. The left iris was blue in its inferior half and brown in the upper half. The inner canthal distance was 44 mm., the interpupillary distance was 63 mm., and the outer canthal distance was 90 mm. The inferior puncta were situated within the limbal margins. Fundoscopic examination revealed bilateral pigment mottling. There were areas of vitiligo of the dorsal surfaces of the wrists but complete examination of the skin was not made.

She had been known to have unilateral loss of hearing which had been attributed to a fall in childhood. Audiometric testing revealed a unilateral, profound loss of hearing of the perceptive type.

There is no known consanguinity in this family and, thus, the occurrence of the syndrome in three successive generations is consistent with Waardenburg's hypothesis of an autosomal dominant form of transmission.

The presence of unilateral, perceptive loss of hearing in 2 family members exhibiting other manifestations of this syndrome adds further support to the theory that unilateral loss of hearing may be the result of the genetic disorder associated with this syndrome.

The presence of similar vitiliginous changes of the skin in members of three successive generations is also of interest and supports the hypothesis that such changes may be a part of the syndrome.

Case 8

W. G. is an 18-year-old, congenitally deaf, white male. He was first seen at the time of our initial visit to the Pennsylvania School for the Deaf, at which time only a superficial physical examination was performed. The parents have not permitted further examination. He has isochromic, light blue irides and a definite gray forelock. The eyebrows were normal and the lacrimal puncta were not displaced. The inner canthal distance was widened but the ocular measurements are not felt to be accurate. The inner canthal distance was less than 40 mm., the interpupillary distance, 69 mm., and the outer canthal distance, greater than 80 mm. Ophthalmoscopic examination of the fundi and irides was not done.

Family history. The patient is an only child. The parents have normal hearing and there is no known history of deafness in his relatives. The parents were unwilling to be interviewed, and, thus, the presence of any other stigmas of the syndrome among family members could not be ascertained.

Case 9

J. P., a 4-year-old Negro female, was seen in the Out-Patient Department of St. Christopher's Hospital for Children

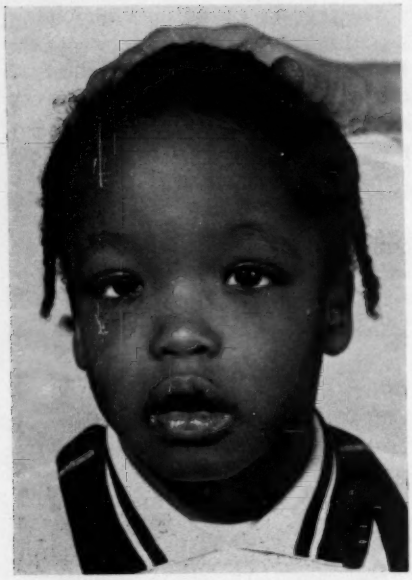

FIG. 18—J. P. Increased inner canthal distance and dystopia of lacrimal puncta. No other stigmas of syndrome. Note tearing on right resulting from lacrimal duct obstruction.

for evaluation of a chronic dacryocystitis and persistent rhinorrhea (fig. 18). She was noted to have a broad nasal root and a widened inner canthal distance. The inner canthal distance was 35 mm., the interpupillary distance was 50 mm., and the outer canthal distance, 80 mm. The inferior lacrimal puncta were displaced laterally and there was a right dacryocystitis. The irides were bilaterally brown and the fundi were normal. There was no white forelock. Audiometric testing revealed a mild conductive loss in the high frequencies but bone conduction was normal. The chronic rhinorrhea was considered to be due to an allergic rhinitis.

The mother of the child had had gray streaking of the hair when she was approximately 20 years of age. At the time of examination she had superficial gray hairs laterally with a central, dark black forelock. The inner canthal distance was 38 mm. and the interpupillary distance was 74 mm. The puncta were in normal position. The irides were brown and isochromic and the fundi were normal. Audiometric testing was not done.

Family history. The patient is one of 3 siblings. A 14-month-old sister is said to have a slightly broadened nasal root and to resemble the proband in appearance. A maternal great uncle of the child is said to have had a white patch of hair but there are no other known affected members of the maternal or paternal families.

Case 10

S. H., an 8.5-year-old Negro girl, was admitted to another hospital following an automobile injury. Because she was noted to be deaf and to have blue irides, she was referred to St. Christopher's Hospital for Children, where she was seen on one occasion. The patient came to the clinic with a 15-year-old sister and the history was fragmentary.

The child was first suspected of being deaf at one year of age because she was not vocalizing. Blue irides had been present since infancy as far as could be recollected. She had been otherwise in normal health and had been attending a school for the deaf for 2.5 years.

Physical examination revealed a girl who was normal with the following exceptions: The irides were pale blue with brown pigmentation at the limbus. The medial canthi were normal. The inferior lacrimal puncta were displaced approximately 4 mm. laterally. The medial portions of the eyebrows were only minimally hyperplastic. The interocular distances were as follows: inner canthal, 26 mm., interpupillary, 53 mm., outer canthal 85 mm. There was no evidence

of grayness of the head hair or eyebrows. There were a few small areas of depigmentation, especially on the neck (fig. 19). Audiometric testing revealed bilateral, profound loss of hearing.

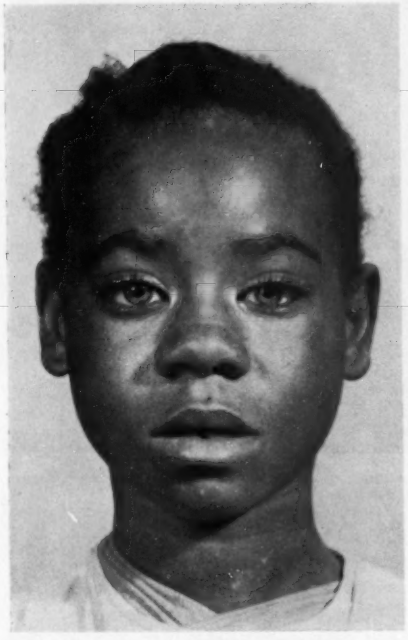

FIG. 19—S. H. Bilateral, pale blue irides. Normal inner canthal distance. Areas of depigmentation on skin of neck. Bilateral deafness.

Family history. No other members of the patient's family are known to have blue irides, gray forelocks, or deafness, but the details of this family history are incomplete.

Case 11

D. D., a 4-year-old Negro girl, was seen by one of us (R.D.H.) for ophthalmological evaluation and was then referred to St. Christopher's Hospital for Children. This child was born out of wedlock to a 16-year-old mother. Pregnancy and delivery had been uneventful but the infant had marked cutaneous depigmentation at birth.

The child is normal in all respects except for the following: (1) blue segment of the right iris from 12 to 1 o'clock and a blue segment of the left iris from 9 to 3 o'clock; (2) large areas of vitiligo on the right leg, the chest and abdomen, and the midline of the forehead (fig. 20). All of these areas were said to have been much larger at birth but are gradually decreasing in size. Although repigmentation has occurred primarily in the periphery of these vitiliginous areas, islands of pigment deposition which grow and coalesce have also appeared. The area of vitiligo on the abdomen originally extended to the right iliac crest and that on the forehead extended to include the medial portions of both eyebrows. The head hair and eyebrows in the areas of affected skin are completely white. Although the skin has developed pigmentation in these areas, the hair has remained white. The ocular measurements are: inner canthal 28 mm., interpupillary 53 mm., and outer canthal 75 mm. Audiometric testing was not completely reliable but no impairment of hearing was detected.

Family history. The mother of this child is said to have had some graying of hair beginning in early childhood and at the age of 20 has moderately gray hair. She has grossly normal hearing, normal brown eyes, and no vitiligo. The mother's 18-year-old sister was examined and found to be normal and a 16-year-old brother and 15-year-old twin brothers are also said to be completely normal. Three younger siblings of the patient, also born out of wedlock, are normal.

The maternal grandfather is said to have developed gray hair in childhood and at the age of 46 has completely gray

FIG. 20—(A) D. D. Blue segments of irides. Marked vitiliginous changes of skin. No dystopia of canthi. No hearing defect. (B) Head and upper torso of patient shown in A.

hair. Slight impairment of hearing was first noted at 43 years of age. He has normal brown eyes and no vitiligo.

No other members of the family are known to have any of the components of Waardenburg's syndrome. None of the examined members of this family showed lateral displacement of the medial canthi.

CLINICAL DESCRIPTION OF THE SYNDROME

The individual components of the syndrome will be described in their order of decreasing frequency of expression as estimated by Waardenburg.[20]

1. *Lateral Displacement (Dystopia) of the Medial Canthi and Lacrimal Points*

In this anomaly there is an increased distance between the inner canthi of the eyelids, whereas the distances between the pupils and between the outer canthi are normal. This results in shortening of the palpebral fissures in the horizontal direction (blepharophimosis). This defect may, at first glance, give the impression of hypertelorism from which it is easily differentiated; in the latter condition the distances between the pupils and between the outer canthi as well as the distance between the medial canthi are increased. When one is familiar with this anomaly, it is as striking as the gray

TABLE I

NORMAL INTEROCULAR DISTANCES (RANGES EXPRESSED IN MILLIMETERS)

	CHILDREN*		ADULTS†	
	3-10 YEARS	10-16 YEARS	WOMEN	MEN
Inner canthal distance	22-30	28-34	24-37	26-39
Interpupillary distance	46-58	55-64	54-72	58-75
Outer canthal distance	70-80	81-90	74-92	77-96

*Data compiled by R. Harley (1 Negro and 19 white children).
†From Waardenburg.[20]

forelock or heterochromia of the irides. It was present in most of our patients and readily apparent even in the youngest (fig. 16). Waardenburg has given the range of normal measurements for the interocular distances of adults of mixed European populations. Since standards for children could not be found, a group was measured by us and the data are combined with those of Waardenburg (Table I). Waardenburg found that the inner canthal distance was 41 to 49 mm. in affected adults and that it had already reached 40 mm. in a 5-year-old boy. Our youngest patient had an inner canthal distance of 40 mm. at 1 year of age. An interesting fact that both Waardenburg[20] and Partington[16] have pointed out and with which we concur is that the anomaly is more easily recognizable in the patient than in photographs. Although the anomaly lends itself to simple objective measurements, it is unfortunate that in some reports[14,4] none are recorded. In some patients little or none of the sclera on the medial side of the cornea is visible, giving the illusion of a convergent squint (fig. 15).

The inferior lacrimal puncta are almost always displaced laterally and may be situated in front of the cornea. The superior lacrimal puncta appeared to be normal in all of our patients. Displacement of the inferior puncta may be associated with disturbances of lacrimal conduction, a complaint which was present in Waardenburg's first patient as well as in several of our children.

2. *Broad Prominent Root of the Nose*

This characteristic is almost invariably associated with hyperplasia of the medial portion of the eyebrows. According to Waardenburg,[20] the median frontal process and portions of the two medial and lateral processes have grown hyperplastic during embryonic development at the cost of the neighboring ocular regions. However, roentgen studies of the nasal areas in 4 of our subjects have revealed no significant deviation from the normal. The peculiar nasal form is easily apparent even in young infants.

3. *Hyperplasia of the Medial Portions of the Eyebrows*

Hypertrichosis of the eyebrows has been described as an inherited trait, often associated with a high nasal bridge. Usually, the eyebrows have been confluent and joined by hairs of normal color. In this syndrome, it is primarily the medial portions of the eyebrows that are hyperplastic. One would rarely expect to detect this trait in adult American women, since the practice of plucking these hairs is so common (fig. 13).

4. *Heterochromia Irides (Total or Partial)*

Hereditary heterochromia iridum as an isolated finding is not common although instances have been reported as early as 1907. In a review of previously

reported cases of simple heterochromia irides, Waardenburg[20] discovered at least 2 instances that were surely examples of this syndrome. Probably the first case of heterochromia on record is that of Anastasius, Byzantine emperor in the fifth century A.D. Anastasius was called "Dicorus," the Greek word for different colored eyes, and it was this distinguishing feature which allegedly contributed to his rise from an army private to emperor.[5] Unfortunately, Dicorus came of an obscure Dalmatian family and nothing is known of his forebears.[6]

An interesting pictorial example of heterochromia is the painting of Leopold Zborowski by Amadeo Modigliani. Zborowski, a Polish poet who befriended Modigliani, had heterochromia which is faithfully reproduced in the painting. We have been unable to determine whether Zborowski had this syndrome; examination of photographs available to us shows hyperplasia of the eyebrows but a gray forelock or dystopia of the canthi is not discernible.

The degree of involvement of the irides is variable. One iris may be completely blue and the other completely pigmented (complete heterochromia) or both irides may be completely blue (isochromia). Not uncommonly the blue iris shows varying sized segments of pigmentation (partial heterochromia). Slit lamp examination of the affected irides reveals loss of stroma and flattening of the iris pattern. It is this hypoplasia which gives the characteristic pale blue color to the iris.

The patient who has isochromic blue eyes with the syndrome presents a special problem. Waardenburg[20] stated the problem as follows: "Do they lack heterochromia because having inherited other genetic factors causing them to have blue eyes the gene for the syndrome is unable to be expressed, or is the hypoplasia in such cases a complete and bilateral one?" In some of his subjects with isochromia, hypoplasia of the iris stroma was present and there was no doubt that the eyes were affected, but in others the irides differed in no way from the normal. For purpose of genetic analysis, however, Waardenburg omitted all patients not having true heterochromia.

The observations made on our patients L. W., J. S., and C. W. are important since they present additional support for Waardenburg's belief that isochromic blue irides do constitute a part of the syndrome in some patients. Blue irides are extremely rare in the Negro and their association with the other features of the syndrome supports his belief beyond any reasonable doubt.[22] The affected irides of all members of this family were pale blue and hypoplastic.

5. *White Forelock*

The forelock may consist of either a few strands or of a large shock of "blazing" white or gray hair in the midline. In the adult female this sign may escape detection owing to attempts to conceal it by tinting. Conversely, in accordance with the dictates of fashion, many women have self-induced white or gray forelocks.

Premature graying of the eyebrows, cilia, or both has been previously described in patients who almost certainly had this syndrome. L. W., a 7-year-old Negro child, demonstrated this finding (fig. 4). This child had no gray forelock and it is possible that the gray eyebrows may represent its equivalent.

Other Possible Characteristics of the Syndrome

Abnormal depigmentation of skin. Although Waardenburg's examination did not include a search for unusual depigmentation of the skin, this was noted on the forehead of one patient and elsewhere on the body of other patients. The

case reported by Klein[11] showed very striking depigmentation of the skin. Mende[13] reported a four-generation pedigree with deaf-mutism and white forelock. This pedigree has been accepted by Waardenburg as an example of his syndrome because the photographs showed dystopia of the canthi. Affected members of this pedigree also showed areas of depigmentation on the arms, legs, hands, and feet as well as graying of the eyebrows.

Partington's report[16] described a depigmented area on the arm and forehead of a 2-year-old child whose mother also had a patch of "albino hairs" on the left leg. Fisch[4] also observed patients with areas of cutaneous depigmentation. Patient D. D. (fig. 20) showed extensive depigmentation and bilateral, partial heterochromia. Since she did not have lateral displacement of the canthi or deafness one could argue that she does not represent a true example of this syndrome. However, the pigmentary defect involving the hair, skin, and irides in the patient and premature graying of the hair in the mother and maternal grandfather seem to justify their inclusion in this paper. We have observed several other patients with depigmentation of the skin but further study is needed to determine whether this abnormality is a component part of the syndrome.

Premature graying of the hair. Premature graying of the hair was noted by Waardenburg[20] in four kindreds, and he speculated that this may represent an equivalent of a white forelock in some individuals. This speculation is partially supported by the report of Partington[16] in which he described an individual who had a white forelock as a child and whose hair turned completely gray at 23 years of age. Our patient, M. L. (fig. 12), also is said to have had a white forelock in her youth and at 40 years of age her hair turned completely white within a short interval of time. Premature graying was a marked feature of the mother and maternal grandfather of patient D. D. (fig. 20) although they themselves were otherwise normal.

Facial appearance. Waardenburg[20] described a characteristic facial appearance in this syndrome which he attributed largely to the abnormalities of the eyelid. Fisch[4] has described the jaw as "massive." The similarity of the physiognomy of our cases is contributed to by features other than the ocular abnormality and the prominent jaw. The face is rather square and, in addition to the broad nasal root, the nose itself is also typical. The nose appears thin owing to the decreased flare of the alae nasi and the tip tends to be rounded and slightly upturned so that the columella is usually easily visible in photographs. The lips are full with a pronounced "cupid's bow" and the distance between the corners of the mouth appears shortened. All of these findings result in a readily recognizable facies which should aid in the detection of the syndrome.

Roentgen examination of the skulls of 5 of our patients revealed no abnormalities. The metopic suture was partially open in one patient, a finding present in 10 per cent of normal adults.[2] Fisch[4] stated that a metopic suture was present in "many cases" but neither the ages of the patients nor the number examined radiographically was given.

Pigmentary changes of the fundi. The fundi of some of our patients have revealed a peculiar pigment mottling especially marked in the periphery. Waardenburg[20] stated that "in a few cases the choroid and fundus seemed to take part in the pigment defect to a minor degree," but the changes noted were not described. He was unable to detect a significant difference in pigmentation of the two fundi of heterochromic individuals. In one of our subjects, the retinal

pigmentary change was noted only in the eye with the blue iris, but in other heterochromic individuals both retinas were affected. The frequency with which the pigmentary changes of the fundi have been noted suggests that it may constitute an integral part of the syndrome.

DEAFNESS AND DISTURBANCES OF PIGMENTARY METABOLISM

In Animals

The occurrence of defective hearing in white animals has been known since 1769.[26] In 1829 Bree (cited by Wolff[26]) described a deaf white Persian cat which produced mixed litters but whose all-white offspring were invariably deaf. In the following year Blulenbach (cited by Wolff[26]) noted that Persian cats are often deaf. In 1847 Sichel[26] noted that white, deaf cats have blue irides. Many of the early workers described these white animals as albinos, but it is known that the white of yellow-eyed or blue-eyed cats is a dominant white[9] and that complete albinism is extremely rare in cats and dogs.[12] Although deafness occurs in white, as well as in the rare albino cats, it does not invariably occur in either.[9]

Wolf[26] reported the transmission of congenital deafness through three generations of white cats. More recently, Wilson and Kane[25] reported their observations on three generations of affected cats and described a white cat which had one green and one blue eye and which was deaf in both ears. This is contrary to the belief of earlier workers who reported that cats with one blue and one green eye are deaf only on the blue-eyed side.

Hereditary deafness associated with white color also occurs in bull terrier, Sealyham and Dalmatian dogs.[27] The authors have also learned of a horse, formerly owned by an ophthalmologist, which was all white except for a black patch on the head, which had one blue and one dark iris, and which was deaf. We have recently examined an all white, blue-eyed kitten which belonged to one of the pediatric residents. Free field audiometric testing of this cat proved it to be deaf.

In Man

In man, the association of pigmentary changes and deafness has been noted in other instances. Of particular interest is the Vogt-Koyanagi syndrome of uveitis, dysacousia, alopecia, poliosis, and vitiligo. This is an acquired, sporadically occurring disorder which has been attributed to various causes of which none have been firmly established.[7,8] In the typical case, pronounced uveitis with eventual atrophy of the pigmented structures of the eye is followed at varying intervals by dysacousia. The deafness which is usually partial disappears over the course of months and is often associated with tinnitus. One to 3 months after the onset of the disease, alopecia appears, eventually followed by poliosis. The poliosis may involve not only the head hair but the eyebrows and cilia and occasionally the body hair. Vitiligo appears at about the same time and may involve any part of the body skin. Many theories of the etiology of this condition have been advanced. It has been frequently noted that the disease appears to follow a respiratory infection or severe emotional trauma. In an excellent review Hague,[7] in 1944, discussed the relationship of pigment disturbances of the eye, hair, and skin and dysacousia.

Deafness is also known to occur in patients with retinitis pigmentosa and is said to complicate 10 to 22 per cent of cases with the recessive form of the disorder.[17]

Histologic Examination

Many investigators have performed

histologic examinations of the inner ears of deaf cats and dogs. The literature on this subject has been completely reviewed by Innes and Saunders.[9] All authors have reported essentially the same pathologic changes, namely, total or partial agenesis of the organ of Corti, the spiral ganglion, and the cochlear nuclei. Wilson and Kane's[25] studies of deaf cats have demonstrated atrophy or complete disappearance of the cochlear duct. The only histologic observation on a human is that of Fisch,[4] who examined the entire auditory pathway of a 3.5-year-old girl who died of bronchopneumonia. Absence of the organ of Corti and atrophy of the spiral ganglion and nerve were demonstrated. Examination of the nuclei of the auditory pathway in the brain stem showed no abnormalities except for the cochlear root of the eighth nerve, "which was thin, poorly myelinated and contained sparse nerve fibers."

GENETIC CONSIDERATIONS

The numbers of kindred studied by us are inadequate to permit significant genetic analyses, but our findings support Waardenburg's hypothesis that the syndrome is inherited in an autosomal dominant manner. Of the kindreds studied by Waardenburg,[20] 83 siblings were found to be normal and 87 were affected, giving the expected 1:1 ratio for an autosomal dominant trait. There was no significant difference in the sex incidence of the eyelid abnormality, of the heterochromia, or of the white forelock. Deafness, however, was found in 21 males and in only 13 females, a difference consistent with the known fact that deaf-mutism from all causes is more common in males. Numerous instances of father-to-son transmission were found, thus excluding sex linkage. The sporadic cases are probably instances of new mutations. The first bearer of the mutation may present with any of the component parts of the syndrome or with any combination of them.

Penetrance

The degrees of penetrance of the individual anomalies comprising the syndrome as estimated by Waardenburg[20] are shown in Table II.

TABLE II
FREQUENCY OF INDIVIDUAL ANOMALIES*

	% PENETRANCE
Total number affected relatives	161
Dystrophy	99
Broad nasal root	78
Hyperplasia of eyebrows	45
Heterochromia	25
Deafness	20
White forelock	17

*Adapted from Waardenburg's data.[20]

These estimations were considered by Waardenburg to be minimal values. Early in his study, the status of the eyebrows and nose root was not recorded, and as many of the individuals were known only from family history or from photographs, the estimation of the frequency of expression of the white forelock is also undoubtedly low. Balding in males, dyeing of the hair in females, or the presence of a few inconspicuous hairs could easily contribute to underestimation of the latter trait. If premature graying of the hair and/or the presence of gray eyebrows or cilia are considered equivalents of a gray forelock, the estimated penetrance for the anomaly would be increased. The estimated degree of penetrance of the iris involvement is also low, since Waardenburg included only individuals showing true heterochromia. Our observations have established the fact that isochromic blue irides are, in some instances, part of the disorder.

The estimated 20 per cent penetrance

for bilateral, profound loss of hearing is probably nearly accurate, but audiometric tests were not done on the affected families studied by Waardenburg.[20] Therefore, the gene effect in 80 per cent of the patients is unknown. Our demonstration of mild to moderate bilateral impairment of hearing and profound, unilateral loss of hearing in some individuals makes it clear that there may be considerable gene effect in patients who are not profoundly deaf.

The penetrance of the various components may vary considerably from kindred to kindred. Waardenburg[20] found that white forelock might be common in one kindred and rare in another; the same is true for deafness and for the heterochromia of the irides.

Frequency of the Syndrome

At the time of our observations at the Pennsylvania School for the Deaf there were 471 students enrolled, of whom 257 (54.6 per cent) were considered to be congenitally deaf. Six students, or 2.33 per cent of the congenitally deaf, were found to have this syndrome. This percentage is only a first approximation. First, since we did not examine all of the students in the institution it would tend to be low. Second, many of the students in the school were not classified as to etiology of deafness and the proportion of congenitally deaf is very probably low, resulting in a high percentage of children with this syndrome. In any event, this figure (2.33 per cent) may be compared with Waardenburg's finding of 1.43 per cent among the personally examined cases of congenital deafmutism in the Netherlands. If he had included 3 additional cases with heterochromia but without dystopia canthorum, the frequency would have been 1.78 per cent. Waardenburg[20] suggested that the same frequency would hold among noninstitutionalized deaf persons and estimated the occurrence of the syndrome (in association with deafness) to be one in 212,121 among the general population. The frequency of the syndrome with or without deafness would then be one in 42,000 individuals.

The number of congenitally deaf individuals in the United States is unknown; therefore, the syndrome in the general population cannot be accurately estimated. In 1958 there were 34,632 individuals with profound loss of hearing attending residential or day schools for the hearing handicapped in the United States.[1] Using either our figures or those of Waardenburg, we can estimate that approximately 400 of the individuals in the schools for the deaf have this syndrome. We have demonstrated that partial or unilateral loss of hearing may occur in this syndrome, a finding which must have been present in some of Waardenburg's subjects. Therefore, the estimated occurrence in the general population of this syndrome as a cause for some form of impaired hearing would be higher than the one per 212,121 as originally estimated by Waardenburg.

CONCLUDING REMARKS

The association of defects of pigmentation with anomalies of various body structures and with deafness has been a subject of interest to many investigators and numerous theories of the pathogenesis of these related occurrences have been proposed. Most recently Fisch[4] has attempted to relate the abnormalities occurring in Waardenburg's syndrome to a genetic defect of the neural crest. Despite the many theoretical postulations proposed, the pathogenetic mechanisms of the anomalies present in this syndrome remain unknown and, as Waardenburg aptly states, "The time is not ripe to delve deeper into the question of the phenogenetic mechanisms or to attempt to solve various other genetic and embryological problems posed by the new syndrome."

The significance of this syndrome at the present lies in the recognition of its association with congenital nerve deafness. Although the relationship between the pigmentary defects and the deafness is purely speculative at this time, the documentation of this syndrome in the American literature may prove a stimulus to others for further investigation in these areas.

SUMMARY

1. Individuals with Waardenburg's syndrome, including the first reported instances in the Negro race, have been presented.

2. This syndrome consists of:

A. Lateral displacement of the medial canthi of the eyes and of the lacrimal puncta.

B. A hyperplastic, broad nasal root.

C. Hyperplasia of the medial portions of the eyebrows.

D. Partial or total heterochromia iridum or isochromic, hypoplastic blue irides.

E. Congenital deafness or varying degrees of partial deafness.

F. White (or gray) forelock.

3. The syndrome is genetically determined and transmitted in an autosomal dominant manner with varying degrees of penetrance of the individual characteristics.

4. Possible additional characteristics of the syndrome have been discussed. These include premature graying of the hair; abnormal depigmentation of the skin; pigmentary changes of the fundi and a characteristic facial appearance.

5. It has been roughly estimated that 2.0 per cent of congenital deafness in the United States may result from this disorder.

6. A summary of the pertinent literature relative to the occurrence of defects of pigmentation and deafness in man and in animals has been presented.

The authors are indebted to Mr. John Nace, Headmaster of the Pennsylvania School for the Deaf, Philadelphia, Pennsylvania, for his cooperation in making available the facilities of the school and for his personal services. We also wish to acknowledge the assistance of Dr. Milton Brutten and Mrs. Marguerite Eversden for the audiometric studies. We are indebted to Dr. Costas A. Zervos for referring Proband 10 to us.

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DISCUSSION

HAROLD F. FALLS, M.D., Ann Arbor, Michigan: It is a pleasure to have this opportunity to discuss this carefully prepared paper, which definitely expands our concepts of this syndrome. A knowledge of the signs and symptoms comprising this syndrome is rewarding from a diagnostic viewpoint; furthermore, it permits placing emphasis on the role played by the ophthalmologist in the detection of systemic disease by recognition of ocular manifestations. Such recognition gives the ophthalmologist a chance to be of service to other disciplines of medical science.

In Waardenburg's syndrome, the role of the gene in its causation looms large. The pleiotropic manifestations, however, are hard to explain on the basis of a single gene action. It must be emphasized, however, that the farther removed from the primary enzymatic aberration (molecular effect), the greater becomes the variability of expressivity. This syndrome warrants careful clinical, biochemical and serologic study in addition to meticulous study of the abnormality in physiology. As to the genetics, both in this excellently prepared paper and in the literature, it appears that the syndrome is due to the effect of a dominant autosomal gene. The widespread and protean manifestations of the syndrome are seldom all present in an affected individual, and a high index of suspicion is necessary when the physician is confronted with a patient exhibiting only partial manifestations (*forme fruste*).

While statistics were not presented, it appears that 99 per cent of the individuals exhibiting Waardenburg's syndrome show a lateral displacement of the internal canthi; in my opinion, it is the key component of this particular entity. Thus, merely observing the patient's facies carefully while taking a history should give you a lead as to the possible diagnosis. This discovery should warrant a careful, complete study of the patient as well

as that individual's immediate relatives. Use of the accompanying kindred may thus be made to further enlarge or expand the syndrome, and such individuals may be of value diagnostically as well as important in research.

All individuals with the Waardenburg syndrome should be subjected to careful audiometry studies; first, to aid the patient if possible (rehabilitation) and, second, to enlarge our scientific knowledge of the particular sign.

From the viewpoint of the ophthalmologist, it is fortunate that most of the symptoms are not particularly deleterious, except from a cosmetic viewpoint and occasional interference with lacrimal drainage.

In conclusion, therefore, I wish to congratulate the authors. They have called our attention to an extremely important syndrome that is not uncommon. In the small community of 40,000 in which I live, I know definitely of four families with this syndrome. I urge, therefore, your clinical observation and awareness of this entity. The entity deserves more attention on your part and, from this stimulating report, expanded research.

THE PROBLEM OF CONGENITAL AURICULAR MALFORMATION

I. Construction of the External Auditory Canal

RICHARD J. BELLUCCI, M.D.
NEW YORK, NEW YORK

ALTHOUGH much has been written on congenital malformations of the ear, the management of these cases still appears to be in a state of evolution. Several aspects of this subject attract particular attention. This presentation deals principally with (1) a method of constructing an epithelized, adequately sized, normal appearing external auditory meatus; (2) the creation of a middle ear which will satisfy the physiologic principles of sound transmission, applying the newer surgical techniques developed through experience with tympanoplasty; and (3) the relationship of the surgical procedure on the external canal to the plastic construction of the external ear.

In 1954 at the Manhattan Eye, Ear and Throat Hospital, we decided to begin a study of congenital malformations of the ear from a combined viewpoint of otologists and plastic surgeons. At that time stenosis and infection of the newly formed cavity frequently followed plastic construction of an external auditory canal. Molds and various prosthetic devices were employed to keep the canal open. Hearing was improved generally by means of fenestration of the horizontal canal. The plastic construction of the external ear was not well advanced and the results were considered unsatisfactory.

From the Hearing and Speech Clinic, Manhattan Eye, Ear and Throat Hospital, New York.

Presented at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

Over a period of four years, 25 cases of congenital auricular malformations were collected and form the basis of this presentation. The technique selected to construct an external auditory canal and a functioning middle ear depends chiefly on the type of anatomic variation encountered. Anatomic variations are rather constant, but the degree of the deformity can be grouped as slight, medium or severe, as done by Henner and Buckingham.[2]

Although there is no end to the minor anatomic variations which occur in congenitally deformed ears, those cases of total absence of cellular development of the mastoid in association with the absence of an external auditory canal present the most difficult problems.

Whenever the external auditory meatus has not developed, the condyle of the mandible articulates directly on the anterior surface of the mastoid bone, and this surface becomes the bony limitation of the joint space (fig. 1, B). It is apparent that the new canal can be constructed only at the expense of the mastoid cells and within the mastoid cavity. When roentgenographic examination shows that the mastoid bone is totally acellular, construction of a new canal is an extremely difficult technical problem. Anteriorly the articulation of the joint cannot be changed; superiorly the dural plate is low; posteriorly the sigmoid sinus is very anteriorly placed, and inferiorly the facial nerve may be super-

ficial. The usual approach to the middle ear and ossicles does not exist, as this triangle of vital structures has reduced extensively the surgical field within the mastoid bone. Surgical approach to the middle ear in these cases can be obtained by elevating the dura, which is the only yielding boundary of this triangle, thus providing the space to reach the middle ear. A graft of bone or other substance will be necessary to support the dura, permitting enough space for the construction of an external auditory canal.[7]

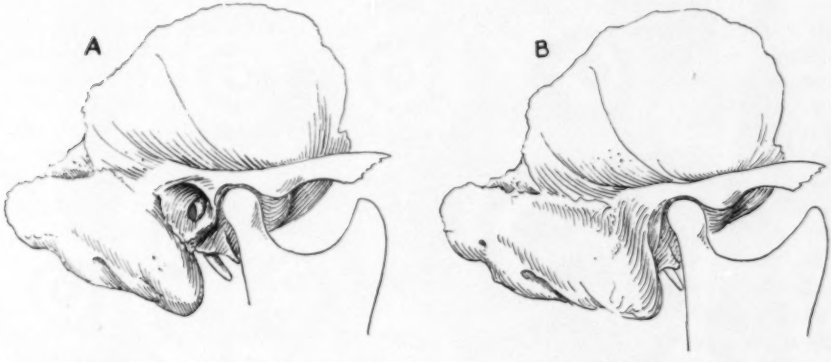

FIG. 1—The presence of a developed external auditory meatus is demonstrated in (A). In (B) the condyle of the mandible articulates with the anterior surface of the mastoid due to the absence of the external auditory canal.

Technically this is a very difficult procedure and should be done only in cases of bilateral malformation. Even for such patients the prognosis is extremely poor and the results are discouraging with regard to improvement in hearing. For this study, only patients with an adequate degree of mastoid cellular development were accepted; consequently, there was no occasion to employ this technique. As mentioned by Henner and Buckingham,[2] Altmann[1] and Shambaugh,[6] the majority of patients have deformities of medium degree, with adequate cellular development of the mastoid and an anatomic distortion which usually follows a fairly consistent pattern. The condyle of the mandible articulates with the anterior wall of the mastoid bone. The mastoid process and linea temporalis are consistent and prominent surface landmarks. The superior and posterior walls of the condylar fossa in which the mandible articulates are important, as they serve as a guide in entering the cortex of the mastoid bone. The cells are removed carefully in a direction which would expose the incus. Excessive excavation of the mastoid cells is to be avoided, as the new external auditory canal will assume the size and shape of the cavity made in the mastoid bone. Excessive removal of cells and cortex will result in a large and ugly external auditory meatus. Usually the posterior edge of the short process of the incus comes into view first. In order to further expose the ossicles, the mass of bone (the so-called atresia plate) which has developed in place of the eardrum and bears the same relationship to the ossicles must be removed. This bone is hard and usually fills the space which extends from the posterior end of the incus to the bone

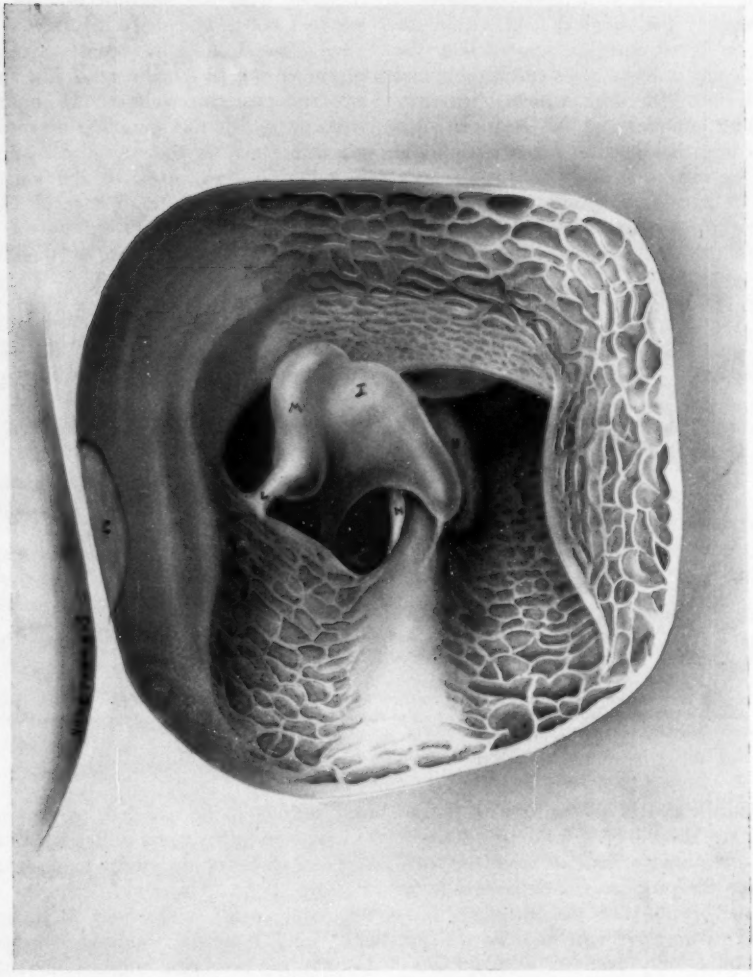

FIG. 2—Typical exposure of the ossicles is demonstrated in a case with adequate cellular development of mastoid. C—condyle of mandible; N—facial nerve; M—malleus; I—incus; H—horizontal semicircular canal; L—ligament attaching malleus to the bone which has formed in the place of eardrum.

which forms the posterior wall of the condylar fossa. When this bone is removed, the deformed ossicles can be seen (fig. 2). The middle ear is exposed adequately only when the incudostapedial articulation, the stapes and the niche of the round window can be examined. In many cases this wide exposure of the middle ear is not possible, as this area is reduced in development and the facial nerve is encountered if the middle ear cavity is enlarged inferiorly.

Of the 25 patients studied, 21 had a unilateral malformation and 4 had bilateral involvement. The cellular development was extensive in 24 of the 25 patients accepted for surgery. One patient had poor cellular development of the mastoid, and 3 were not acceptable because no cellular development was demonstrated on roentgenologic examination of the mastoid. Fortunately, these patients had unilateral malformation and surgical intervention was not necessary.

Surgical exploration showed the malleus and incus fused in all 25 patients accepted for this study. This ossicular mass was solidly fixed in 10 cases and movable in 15. The malleus in all cases was the more deformed ossicle. Usually the incus appeared larger than the malleus. This was found to be true in 18 cases, and both ossicles appeared to be of normal size in 6. In 16 cases the stapes was movable and had a normal appearance. In 9, the ossicle was small and deformed. The head of the stapes failed to make contact with the lenticular process of the incus in 15 cases. In 3 cases the stapes was very small and fixed to the bone covering the facial nerve. The deformity of the stapes usually was found to be associated with a poorly developed middle ear space and with abnormalities in the position of the facial nerve.

The facial nerve in its course through the middle ear was not covered by bone in 7 cases, and the nerve followed an aberrant course in 5 cases. The abnormal course of the facial nerve seemed to be more common when there was an associated deformity of the face and jaw. In 5 out of 6 cases of deformity of the face and jaw, the facial nerve was seen to follow an aberrant course through the middle ear (mandibulofacial dysostosis, as described by Treacher-Collins and by A. Franceschetti and P. Swahlen). In this study the course of the facial nerve was between the oval window and the horizontal semicircular canal in all cases. However, in the 5 patients in whom the nerve was found to take an unusual route, the facial nerve was seen to turn anteriorly at the level of the round window instead of proceeding inferiorly toward the stylomastoid foramen (fig. 3). In two cases the nerve was exposed and bruised by the bur in attempting to expose the middle ear sufficiently. In both of these cases the entire facial nerve was exposed from the geniculate ganglion to the point where it emerged from the mastoid bone. It then was decompressed by slitting the sheath. This additional surgical procedure was considered imperative, as immediate decompression of the traumatized nerve definitely prevents paralysis. In both of these cases, although considerable swelling of the nerve had developed during the operation and the face twitched repeatedly during the decompression procedure, paralysis or facial weakness did not occur in the postoperative period. It is much better to decompress the nerve immediately at the slightest suspicion of injury than to add a facial paralysis to an ear malformation in a patient whose parents are already emotionally sensitized to disfigurement. Neither postoperative facial weakness nor paralysis was observed in this series of cases.

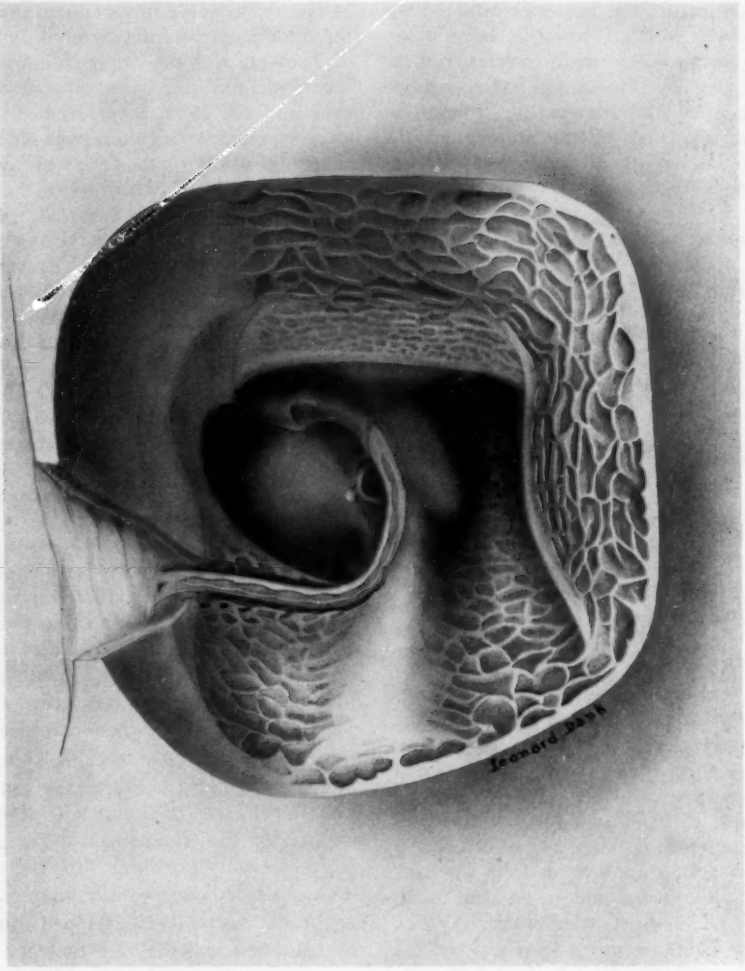

FIG. 3—Frequently found anomaly of facial nerve is demonstrated. Here nerve turns anteriorly at level of the round window niche instead of continuing inferiorly to stylomastoid and foramen. Decompression is indicated when injury to nerve is suspected.

In one patient the middle ear was reduced to approximately one fourth its normal size. It contained a deformed fixed stapes which was very small and adhered to the facial nerve. The nerve circled the middle ear cavity to make a quick exit anteriorly (fig. 4). The most peculiar aspect of this unusual anatomy was the broad area of bone between the horizontal canal and the facial nerve. Because the stapes was nonfunctioning and the middle ear was so small that a graft could not be placed in the proper position to obtain any degree of func-

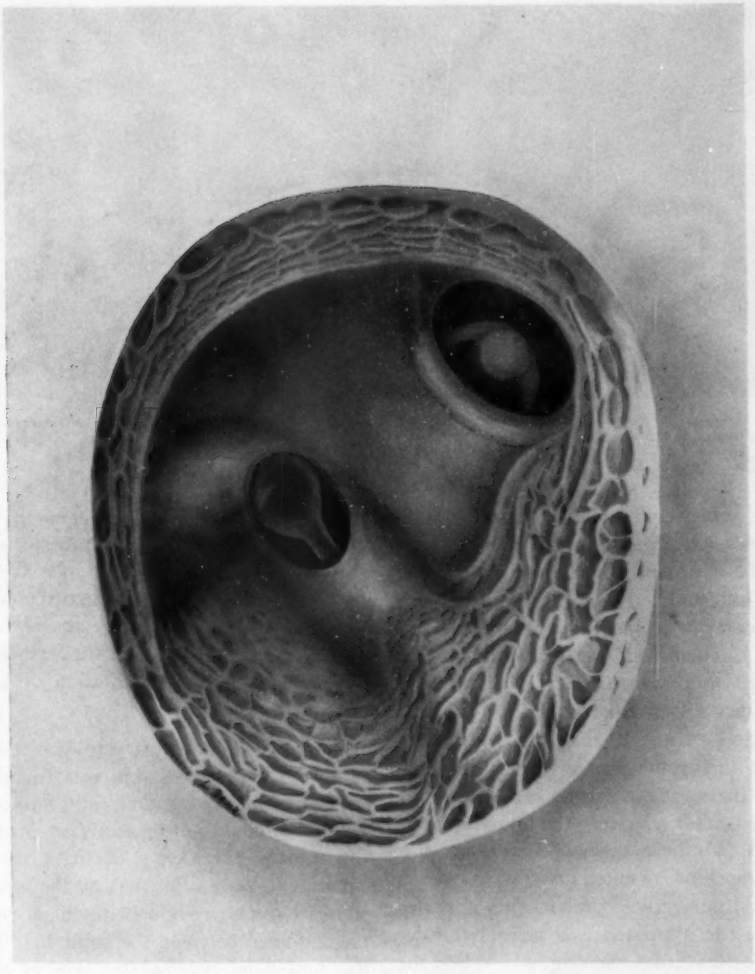

FIG. 4—Very deformed middle ear is demonstrated. The facial nerve turns anteriorly, limiting the required exposure of the middle ear. A broad expanse of bone lies between the horizontal semicircular canal and the oval window. Hearing was improved by means of fenestration of horizontal canal.

tion, a primary fenestration of the horizontal canal was performed for the improvement of hearing.

CONSTRUCTION OF THE EXTERNAL AUDITORY MEATUS

Regardless of the position of the deformed rudiments of the external ear, the new external auditory meatus takes a consistently proper position, as the approach through the mastoid bone to the middle ear cannot be varied. The new canal therefore anatomically assumes the correct position at the side of the

FIG. 5—(Left) External auditory meatus constructed anterior to rudimentary ear. (Right) The results of the posterior approach.

head with regard to the other ear. It is relatively unimportant, therefore, whether the approach for the construction of the external auditory canal is anterior or posterior to the rudimentary external ear. In our first 16 cases, the approach to the mastoid was made behind the rudimentary external ear and this structure had to be transposed behind the meatus later during the plastic surgery. The initial incision was made anterior to the rudimentary ear in the remaining 9 cases. In these cases a somewhat slitlike opening resulted in contrast to an almost perfectly round meatus obtained when the approach was behind the deformed external ear (fig. 5). When the rudiments have developed in a more anterior position at the side of the head, they must be elevated and retracted posteriorly in order to reach the proper position on the mastoid bone. This accounts for the slitlike meatus and the rather long subcutaneous external auditory canal.

After the middle ear has been exposed and widened and the contents studied with regard to the type of reconstruction necessary for restoration of hearing, a skin graft is placed into this cavity. The graft is designed to cover all parts denuded by the surgery and also serves in place of the tympanic membrane in the rehabilitation of middle ear function.

The skin graft formerly was taken from the thigh. This skin was found to be thick and coarse and rather unsuitable, as it could not be easily adapted to the middle ear cavity. Also, a rather prominent scar remained at the donor site. All grafts are now being taken from the abdomen between the pubic hair and the umbilicus, where the skin is thin and the resulting scar is inconspicuous. The average case will require a 4 cm. by 6 cm. piece of skin, 14 millimicrons in thickness.

The skin graft is sutured to the anterior side of the original incision with closely placed plain catgut sutures (fig. 6). The skin graft is then inserted into the mastoid cavity ahead of a piece of Gelfoam moistened in penicillin solution

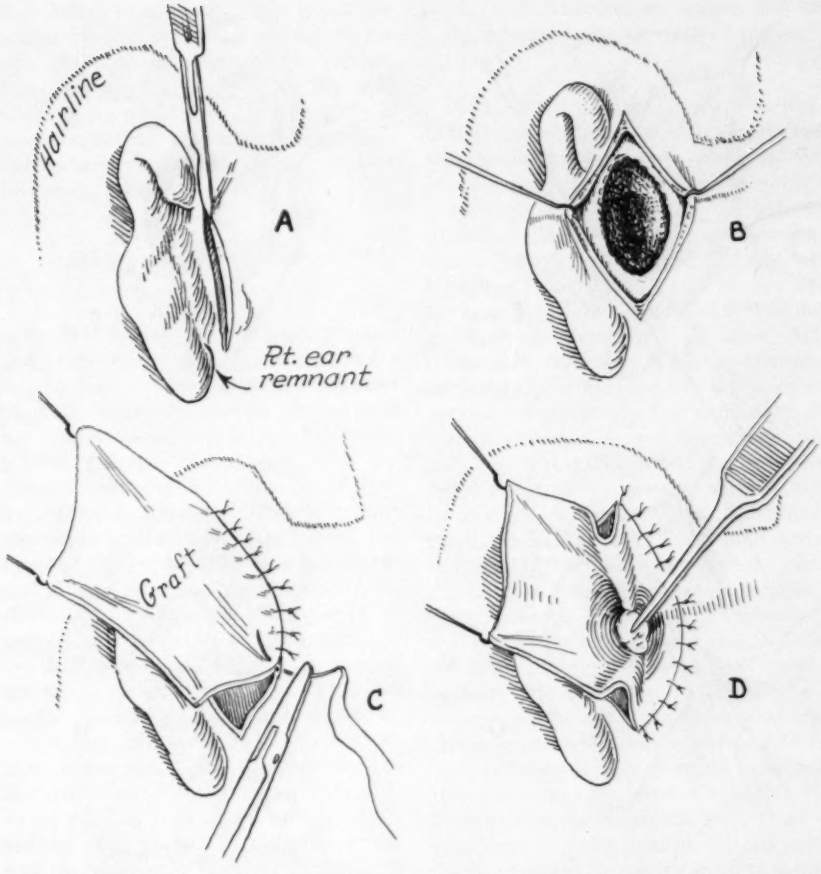

FIG. 6—(A) Initial incision is made anterior to rudimentary ear. (B) Exposure after the middle ear is exposed. (C) Graft is sutured to anterior side of incision. (D) Skin graft is advanced ahead of Gelfoam packing.

(5000 units per cubic centimeter). The square skin graft does not fit the cavity precisely; it must be trimmed superiorly and inferiorly and the cut edges sutured in order to leave no part of the cavity uncovered by skin (fig. 7). The remainder of the mastoid cavity is filled tightly with parresined lace-mesh. After the skin graft is trimmed, it is sutured to all remaining edges of the incision. If no portion of the cavity remains uncovered by skin, healing usually takes place rapidly by primary union. Because no granulations are formed, the size of the newly constructed external auditory meatus remains constant and resists narrowing. The cavity is allowed to remain packed for at least five days, preferably seven or eight, unless it becomes malodorous.

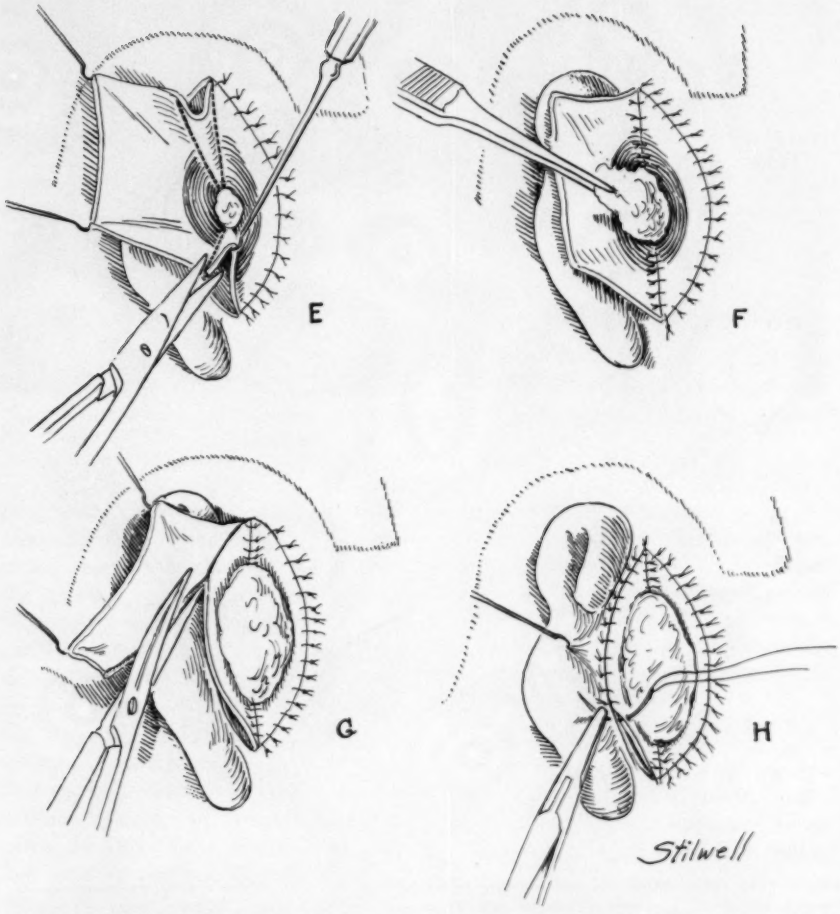

FIG. 7—(E) Graft is trimmed to fit mastoid cavity. (F) Incisions are sutured leaving no surface of mastoid uncovered by skin. (G) Excess graft is trimmed. (H) Suture line is completed at posterior side of original incision.

The donor site is covered with Telfa gauze and a pressure dressing is applied. This dressing is changed on the first and the fifth days after the operation. At the time of discharge, usually on the tenth day, the donor site is almost completely healed.

Of the 25 cases studied there was none in which a prosthesis was required to maintain patency of the newly created canal; and although three patients had meatuses which were considered smaller than desirable, they were of adequate size to permit cleaning of the postopera-

tive cavity. Five patients had a wet ear caused by the loss of a portion of the skin graft in the postoperative period. This loss usually occurred in the skin covering the middle ear. In two of these cases, regrafting was accomplished with satisfactory results; three still require further attention.

RESTORATION OF THE SOUND-CONDUCTING APPARATUS

In 1947 Pattee[4] in the United States and Ombredanne[3] in France reported a series of cases of improved hearing after surgical reconstruction of the middle ear. Ombredanne relied upon the fenestration operation for restoration of the sound-conducting mechanism, but Pattee applied the skin graft directly against the stapes in the middle ear cavity. Because of the great variation in the degree and type of anatomic malformations, serious limitation can occur in the application of any one technique. More recently, Wullstein and Zollner have exerted a strong influence on otology. They advocate judicious consideration of all middle ear structures in the reconstruction of the middle ear. The anatomy of the ear is carefully appraised; the diseased portion is removed and carefully studied with the aid of the microscope, and the middle ear is then reconstructed by the most applicable method. The surgeon has a variety of maneuvers from which to choose, ranging from the application of the skin graft directly over the intact functioning ossicular chain to the fenestration of the horizontal canal when the middle ear structures are not salvageable.

In the last few years the techniques for the restoration of middle ear function have become more stabilized. The classification of Wullstein[8] has been used in this study in organizing these cases according to the pathologic changes in the sound-conducting system and as a guide to the reconstruction of the middle ear.

As reported by Ruedi,[5] the fenestration of the horizontal canal can produce an excellent immediate postoperative improvement in hearing, but in a high percentage of patients, the hearing returned to the preoperative level within one to five years. Our patients doubtlessly will follow a similar course. We believe, as does Shambaugh,[6] that it is not necessary to fenestrate all cases routinely. The fenestration of the horizontal canal opens the inner ear to possible serious complications, but utilization of functioning middle ear structures not only avoids this danger but may improve hearing to a higher level, which may also be more stable. Fenestration of the horizontal canal, however, was found to be indicated in four cases in which the middle ear was reduced in size or in which the stapes was found to be rudimentary and nonfunctioning. Under these conditions the fenestration was done as the primary operation. In most cases the stapes was the only functioning ossicle. In these cases the middle ear had to be widened considerably in order to be able to satisfy the criteria of a type III reconstruction, in which the skin graft is supposed to make contact directly with the head of the stapes. In making a sufficiently wide exposure for the application of the skin graft, the facial nerve was found to cross the middle ear in an aberrant course in several cases as already mentioned above. In six cases the malleus and incus were nearly normal and apparently could function well, as they made contact with a mobile stapes. The skin graft in these cases was applied over these ossicles directly. This is a type II reconstruction of the middle ear. The results obtained in this group of 25 patients by the application of these principles are presented in table I.

TABLE I

IMPROVEMENT IN HEARING MAINTAINED OVER SIX MONTHS

TYPE OF REPAIR	NUMBER OF CASES	IMPROVED TO OR ABOVE 30 DB
II	6	3
III	15	6
V	4	3

In approximately 50 per cent of all patients, the hearing was improved to the 30-decibel level or better after six months or longer. Although the fenestration of the horizontal canal improved hearing in three of four patients in this group, regression may occur at a later date. We believe an attempt should be made in every case to reconstruct the middle ear at the initial operation if the middle ear structures are salvageable. If an improvement in hearing is not obtained, the fenestration of the horizontal canal can be done as a secondary procedure at a later date. When the middle ear structures cannot be utilized in the reconstruction, we fenestrate the horizontal canal at the primary operation.

RELATED PROBLEMS INVOLVED IN THE CONSTRUCTION OF THE EXTERNAL AUDITORY CANAL AND EXTERNAL EAR

As the operative field for the construction of the external auditory canal is directly beneath the auricle, it follows logically that the surgical procedures on the middle ear and canal should be done first. When the canal is healed completely with an intact lining of skin, the subsequent plastic procedure rarely causes any disturbances in the new canal. The canal also helps to locate the new ear at the proper point at the side of the head.

A well-made canal and meatus lend a definite appearance of realism to the newly constructed external ear which is not obtained otherwise. Several aspects of the reconstructive procedure need careful consideration if there is a unilateral malformation. Hearing, of course, can be improved in 50 per cent of the cases to above the 30-decibel level. This offers some encouragement to the patient with bilateral involvement. On the other hand, when hearing is normal in one ear and malformation is unilateral, the improvement usually obtained is not quite enough for the patient to appreciate a significant change. Although the construction of the canal adds to the appearance of the reconstructed external ear, we have not done this routinely for patients with unilateral involvement because a wet ear may result or the patient may be disturbed by caring for a postoperative cavity, although dry. Some otologists believe that the creation of an external auditory canal and reconstruction of the middle ear will benefit the patient from a psychological standpoint. A reserve of hearing is also provided if the operation is successful. Other otologists, however, support the view that this procedure should be done only in patients bilaterally affected. We are in accord with the latter group.

With all due respect to the remarkable advances in plastic surgery of the external ear, considerable progress will be necessary in order to produce routinely an external ear which has a normal ap-

pearance. The addition of a meatus becomes somewhat insignificant, as the appearance of most auricles after plastic surgery do not approach a high degree of perfection.

One important argument in favor of the creation of an external auditory canal is the possibility of an infection of the mastoid which has no route of drainage to the exterior. In the great majority of patients, the eustachian tube is patent and an infection of the pneumatized mastoid bone is quite possible. In fact, one patient in the series had all the mastoid cells filled with a gelatinous substance much like that seen in chronic secretory otitis media (glue ear). There were granulation tissue and exudate in the middle ear cavity and the patient was running a low grade fever. It could happen that the results of a painstaking plastic surgical procedure which required several operations, many under general anesthesia, may be placed in jeopardy, with a considerable loss of time and effort, if a mastoid infection has to be treated surgically.

SUMMARY

1. Many minor variations in the anatomy occur in the congenitally deformed ear. The most serious deformities are the total absence of cellular development of the mastoid and the aberrant course of the facial nerve. The surgical management of the patient with a medium degree of deformity has been described.

2. A method of constructing an external auditory meatus which resists postoperative stenosis and has a satisfactory cosmetic appearance has been described.

3. The application of the principles of tympanoplasty increases the possibility of an improvement in hearing which is more stable than that obtained by the fenestration of the horizontal canal, as the latter frequently shows a tendency to close in children.

4. The construction of the external auditory canal should be the primary procedure when it is done in conjunction with the construction of an external ear.

CONCLUSION

In a careful evaluation of the advantages and disadvantages which exist in constructing the external auditory canal in an individual with a unilateral malformation, we can conclude that these patients do not benefit materially as a result of this surgery. For cases with bilateral malformation, the surgical advances with respect to hearing improvement and appearance of the external auditory meatus are considered of great importance and should benefit these patients immeasurably.

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DISCUSSION

ROBERT HENNER, M.D., Chicago: This opportunity to discuss Dr. Bellucci's paper on the problem of congenital malformation of the ear and construction of the external auditory canal gives me a great deal of pleasure. I should like to compliment Dr. Bellucci on his timely and meticulous evaluation of the problem of congenital atresia and stenosis.

I wish to emphasize the difficulty of performing a surgical operation in those cases which we have termed type III, or acellular mastoids. Should a surgeon attempt to construct a sound-conduction apparatus in such immaturely formed ears? In our experience, percentage of success weighed against the dangers of causing facial paralysis does not justify surgical correction when no antrum or middle ear can be adequately demonstrated roentgenographically. Our observations of more than 75 congenitally deformed middle ears with class II type of deformity (the complete stenosis with good cellular development of the mastoid) agree with today's presentation. I should like to stress that serious anomalies of the facial nerve in well developed mastoids occurred in only one case in this group of individuals. Dr. Buckingham has made photographs of the patient in this case, and I should like to present a few of his pictures. This is the only instance in my experience with over 4,000 temporal bone operations in which I found the facial nerve in the middle ear out of its usual position in the area between the oval window and the horizontal canal.

I highly endorse the statement that an attempt should be made to reconstruct all middle ears where anatomically feasible. In this day of chemotherapy and improved microscopic surgery and advances in physiologic knowledge, it is incumbent upon otologists to aim for the goal of restoring hearing to all patients who have a sound-conduction deafness. Also with the rapid progress being made in reconstruction of the external ear, I feel that we are very near our goal of a functioning, cosmetically acceptable ear in most cases of congenital malformation. Dr. Bellucci's study is a step in this direction.

In our most recent cases we have aimed at excavating only enough cells to ensure adequate exposure of the middle ear. Then if the malformed synostotic ossicles transmit motion to the stapes, we leave them, and place a tympanomeatal skin graft in contact with the ossicle chain. An external canal channel of normal size requires little or no treatment and removes the objection of annoying aftercare. The plastic surgeon is then free to continue the external ear construction in a clean field.

I should like to take the opportunity at this time to disagree with Dr. Bellucci in one area: namely, the unilateral malformation when the ear has a well developed mastoid process. There is a psychological advantage to be gained by restoration of hearing to such an ear to the level of 30 degrees or better; the secure feeling of having a functioning ear cannot be denied. The child with his hearing improved has less concern over the external deformity he carries. In addition, most of these children, in my opinion, function much better as binaural-hearing people with the hearing reduced from 60 decibels or more to 30 decibels or less in spite of the fact that the other ear is normal.

I should like to state parenthetically that at the Illinois Eye and Ear Infirmary, we feel we have no preference as to where we put our incision when the external ear is very small and atresic. We do most of ours with what amounts to an endaural incision, trying to approximate an exact relationship with the opposite ear, and the plastic surgeons do the external reconstruction later.

THE PROBLEM OF CONGENITAL AURICULAR MALFORMATION

II. Construction of the Auricle in Congenital Microtia

JOHN MARQUIS CONVERSE, M.D.
NEW YORK, NEW YORK

THE techniques employed by the author in surgical reconstruction of the auricle were reviewed in 1958.[1] In 1959, Tanzer described the techniques which he used, introducing considerable refinement in the shaping of the auricular framework and giving new impulse to this difficult aspect of reconstructive surgery. The techniques presently employed by the author are adaptations of Tanzer's techniques with the additional contribution of a composite graft from the unaffected ear to provide the concha of the reconstructed auricle. The results obtained by these methods will be described in a later report.

The preliminary opening of the middle ear cavity and the construction of an external auditory canal, as reported in 1958, have been abandoned. From the observations made in a series of 25 patients operated upon in association with Bellucci,* it was concluded that this procedure was contraindicated in unilateral microtia if a normal contralateral ear is present. Two principal factors led us to this conclusion: (1) the improvement in audition is not sufficient to warrant the procedure; (2) the inevitable scarring of the skin of the area hampers the subsequent reconstructive surgery.

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Presented at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

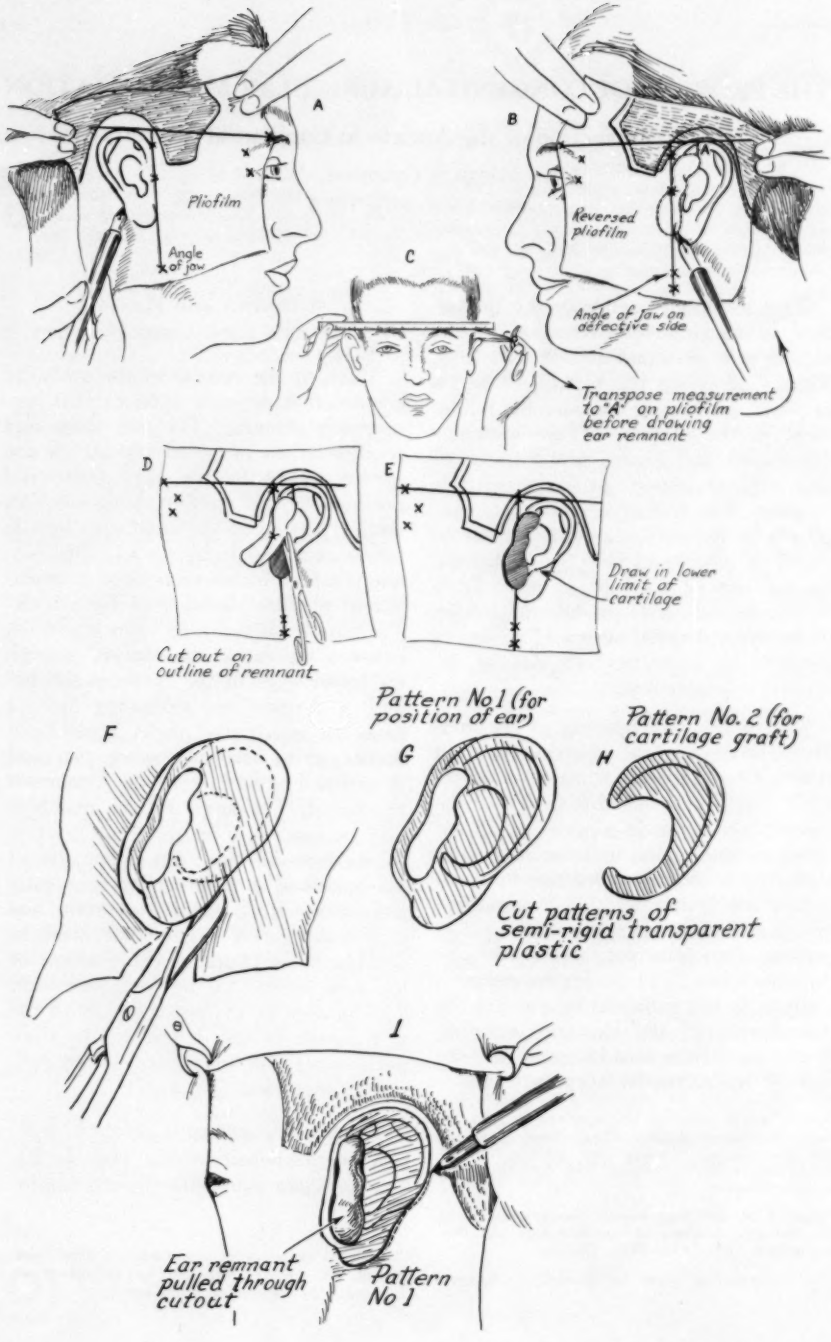
*See accompanying paper by Richard J. Bellucci, M.D.

PLANNING AND PLACING THE NEW AURICLE*

Much of the success of the auricular construction depends upon careful preoperative planning. The size, shape and position of the proposed new auricle are predetermined by the size, shape and position of the unaffected auricle. An outline pattern of the unaffected auricle serves as a model (fig. 1, A). This outline is traced in ink on a piece of transparent pliofilm placed over the auricle. The auricle normally occupies a position below a horizontal line drawn through the upper edge of the eyebrow and behind a vertical line extending upward from the mandibular angle. These landmarks are of assistance when the head is oriented according to the Francfort horizontal. The angle of the mandible may be located in an abnormal position on the defective side; this asymmetry of the mandible is a deformity frequently associated with congenital microtia, and is a complicating factor that must be considered in planning the position of the new auricle on the defective side. The location of the upper border of the new auricle is best determined by comparison with the unaffected ear on full-face examination (fig. 1, C).

The pliofilm pattern is placed in position on the defective side (fig. 1, B). The auricular remnants furnish invalu-

*The author expresses his appreciation to Miss Daisy Stilwell for the drawings and for her assistance in planning the construction of the auricle.


A
Pliofilm
Angle of jaw
B
Reversed pliofilm
Angle of jaw on defective side
C
Transpose measurement to "A" on pliofilm before drawing ear remnant
D
Cut out on outline of remnant
E
Draw in lower limit of cartilage
F
Pattern No 1 (for position of ear)
G
Pattern No. 2 (for cartilage graft)
H
Cut patterns of semi-rigid transparent plastic
I
Ear remnant pulled through cutout
Pattern No 1

able tissue for the new lobule and should be preserved. The contour of these remnants is outlined on the pliofilm pattern. The area outlined over the remnants is cut through and removed, thus permitting the pattern of the auricle to be placed in the correct position with the auricular remnants protruding through the opening in the pliofilm (fig. 1, D and E). The auricular remnants in this way assist in assuring the correct position of the new auricle. The outline of the pattern for the new auricle is cut through (fig. 1, F and G). An additional pattern of the contour of the auricular cartilage is prepared (pattern 2). This second pattern will be employed to outline the costal cartilage graft for the auricular framework.

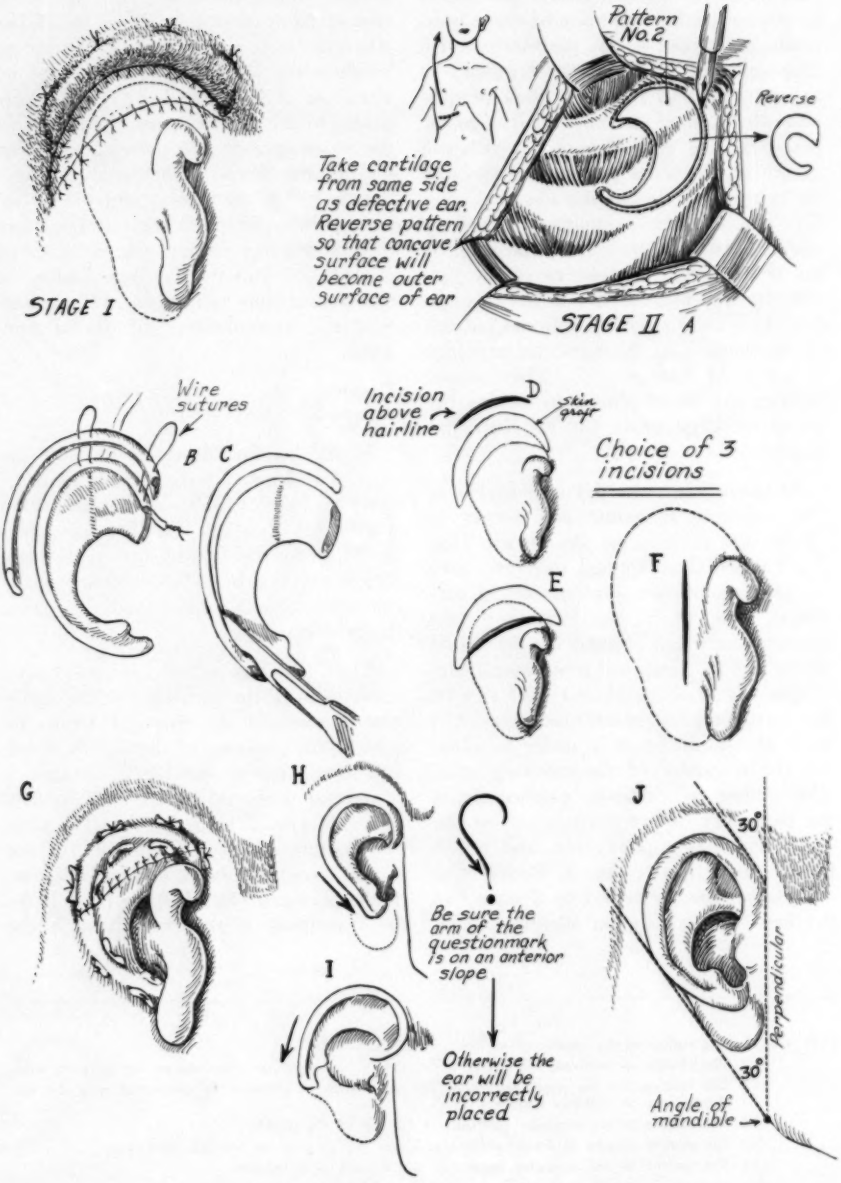
At operation, pattern 1 is placed over the auricular remnants and serves to outline the position of the auricle (fig. 2). Pattern 2 is applied over the area of junction of two adjacent costal cartilages over, or in, the vicinity of the common cartilage formed by the union of the eighth, ninth and tenth costal cartilages (fig. 2, stage II, A). The size of the cartilage graft should be diminished by 3 or 4 millimeters in order to allow for the thickness of the covering skin. The ellipse of cartilage excised from the periphery of the graft serves as the onlay which is applied over, and wired to, the main graft (fig. 2, B and C). This technique, described by Tanzer,[5] is the key to obtaining an adequate helix border. When the costal cartilage is removed from the same side as the defective ear, it is turned inside out to reproduce the outward curvature and inclination of the auricle. The perichondrium of the outer surface then becomes the inner surface and serves as a splint, binding the two adjacent costal cartilages together. The perichondrium of the inner surface, which is the outer surface of the new ear framework, is removed in order to thin the cartilage and carve the depressions which form the characteristic convolutions of the framework.

TECHNIQUE

If the hairline descends too low, an area of scalp is raised as a flap, as practiced by Peer[4] (1959), and folded upon itself (fig. 2, stage I). The raw area produced by the folding up of the scalp flap is covered by a full-thickness graft of retro-auricular skin removed from the unaffected ear.

After this has healed (an interval of many weeks), the cartilage for the auricular framework is removed from the area of the junction of the eighth, ninth and tenth costal cartilages through a transverse incision placed in a natural skin fold (fig. 2, stage II, A). The pliofilm pattern is placed over the surface of the costal cartilages and an ink outline is obtained (fig. 2, stage II, A). As the transplant is removed through the

FIG. 1—(A) The outline of the unaffected auricle is traced on pliofilm.
(B) The pliofilm is removed, and a tracing is made of the auricular remnants on the defective side.
(C) The location for the upper border of the new auricle is obtained by comparing with the unaffected ear on full-face examination.
(D) The outline of the auricular remnants is cut out of the pliofilm.
(E) The pliofilm pattern is fitted over the remnants, which protrude through the cut-out.
(F) The outline of the auricular pattern is cut through with scissors.
(G) Auricular pattern 1 ready for use at operation.
(H) Pattern 2, representing the contour of the auricular framework.
(I) At operation, pattern 1 is placed over the auricular remnants and an ink outline of the new auricle is traced on the patient's skin.


STAGE I
Take cartilage from same side as defective ear. Reverse pattern so that concave surface will become outer surface of ear
Pattern No. 2
Reverse
STAGE II A
Wire sutures
B
C
Incision above hairline
D
Skin graft
Choice of 3 incisions
E
F
G
H
Be sure the arm of the questionmark is on an anterior slope
I
Otherwise the ear will be incorrectly placed
J
30°
Perpendicular
30°
Angle of mandible

entire thickness of the cartilage, the inner surface of the cartilage must be freed in order that the operator's hand be placed under the cartilage, protecting the pleura. The muscles and pleura are separated extraperichondrially from the cartilage by blunt dissection by means of gauze sponges. The onlay is obtained from the cartilage at the periphery of the graft from the full-thickness of the cartilage (fig. 2, stage II, B and C). It is suitably shaped and wired to the lateral aspect of the edge of the auricular framework.

The new auricular framework is implanted in the correct position and the covering skin is adapted to the cartilage by means of vertical mattress sutures bolstered on small pieces of absorbent cotton (fig. 2, stage II, D, E, F, G). The figures illustrate the precautions to be taken to inset the implant in the correct position (fig. 2, Stage II, H, I, J).

After a time interval of two or three months, the auricular framework is raised and the resulting raw retro-auricular area is covered by a split-thickness graft removed from the gluteal area, a suitable donor area which avoids scarring of more visible areas in female patients. The dental compound mold technique is usually employed for the fixation of the skin graft (fig. 3, stage III). It is important that a portion of the upper part of the auricle remain attached to the cranium to ensure fixation of the new auricle and adequate blood supply. In a later stage the auricular remnants are split into two portions, the lower forming the lobe (fig.

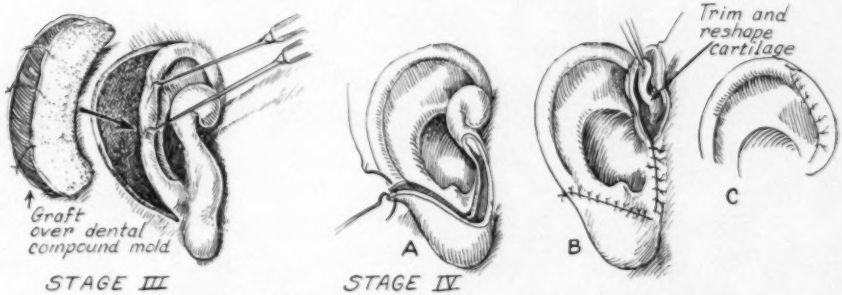


FIG. 3—Stage III. The auricular framework is raised. A split-thickness graft on a dental compound mold is applied to the raw retro-auricular area.

Stage IV (A). The lower two thirds of the auricular remnants furnish the lobe of the new auricle. (B) and (C). Utilization of the upper one third of the auricular remnants for the anterior position of the helix.

FIG. 2—Stage I. The hairline is moved upward by an upward rolling of the flap upon itself. The remaining defect is covered by a retro-auricular skin graft from the unaffected ear.

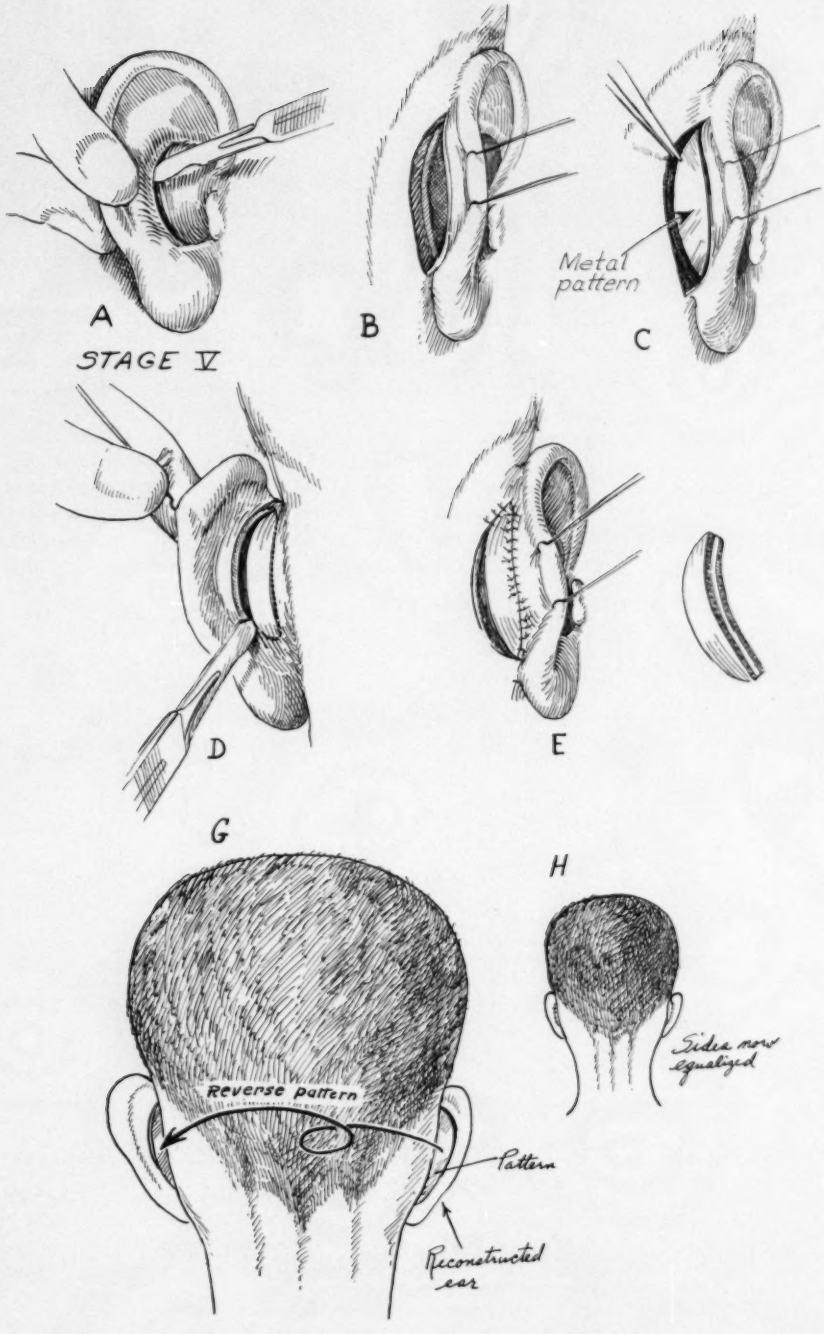
Stage II (A). The area from which the cartilage graft is removed through the full-thickness of the cartilage. Pattern 2 provides the outline of the cartilage graft which is removed, reversed and turned inside-out.

(B) and (C). Attachment of the cartilage onlay to the cartilage graft by means of fine-calibered stainless steel wire sutures.

(D), (E) and (F). Various incisions from the implantation of the cartilage graft.

(G). Intimate contact of the skin to the cartilage is provided by a number of vertical mattress sutures bolstered on small pieces of cotton.

(H), (I) and (J). The correct placing of the cartilage graft is important.


A
STAGE V
B
Metal pattern
C
D
E
G
Reverse pattern
Pattern
Reconstructed ear
H
Sides now equalized

3, stage IV, A), and the upper portion rotated on itself after the contained cartilage has been reshaped or excised. They are joined to the anterior portion of the new helix (fig. 3, stage IV, B and C). The new auricle has a helix and a lobe, but requires a concha, a tragus, and a semblance of an external auditory canal. The completion of the auricle is shown in figures 4 and 5, illustrating stages V and VI; these two stages in the surgical construction of the auricle may be performed in one operation.

A through-and-through incision is made along the anterior border of the cartilage implant, extending backward through the skin of the retro-auricular fold (fig. 4, A and B). The helix may now be raised laterally, remaining attached to the cranium above and below. Tanzer[5] attributes the conception of this technique to Kirkham.[3] It is referred to in our clinic as the "valise-handle" procedure. The auricle now assumes a position with an adequate degree of protrusion from the side of the head.

The maintenance of the new auricle in this position can be assured by the addition of a composite graft of concha from the unaffected ear (fig. 4, C, E, F, G, H). In order to obtain a pattern of the conchal graft, a piece of soft metal is cut and shaped to fit the defect (fig. 4, C). The metal pattern is then applied to the concha of the unaffected ear and serves to outline the composite graft. When the composite graft is removed from the donor ear and transferred to the defective ear, the medial edge of the graft becomes lateral and vice versa. It is necessary, therefore, to place the metal pattern in an upside-down position on the donor ear in order that the graft, after transfer, will fit the defect as planned (fig. 4, G). The graft is now inserted into the defect and is closely adapted to the edges of the defect by sutures with close approximation of the skin edges of graft and defect. This procedure ensures the maintenance of an adequate degree of protrusion of the newly constructed auricle; the donor ear is brought closer to the side of the head. An operation for the correction of protruding ears may be required to adjust the donor auricle and to equalize the two auricles.[2]

In the same stage, or in a later stage, the tragus is constructed by means of a flap of skin raised from the area where the external auditory canal should be located and folded upon itself (fig. 5, A and B). The inclusion of a small piece of cartilage will prevent contraction of the skin after folding (fig. 5, B and C). The subcutaneous tissue is excised until the periosteum of the mastoid is reached, and a full-thickness retro-auricular skin graft is applied to the area, sutured in position and maintained in the cul-de-sac of the new canal by a mold of dental compound. This technique produces a semblance of an external auditory canal.

FIG. 4—The "valise-handle" procedure and composite conchal graft from the unaffected auricle.

(A) Incision along the anterior border of the cartilage graft. The incision extends into the retro-auricular fold.

(B) The reconstructed auricle may now be raised into an adequately protruding position.

(C) A soft metal pattern is cut to shape and fitted into the conchal defect.

(D) An outline has been made by tracing an outline of the metal pattern. The composite graft is removed from the full thickness of the concha.

(E) The composite graft is inserted into the conchal defect of the new auricle.

(G) The pattern must be turned upside down on the donor ear. In this manner the composite graft will be of the correct shape for the defective auricle.

(H) The two auricles now show a symmetrical degree of protrusion.

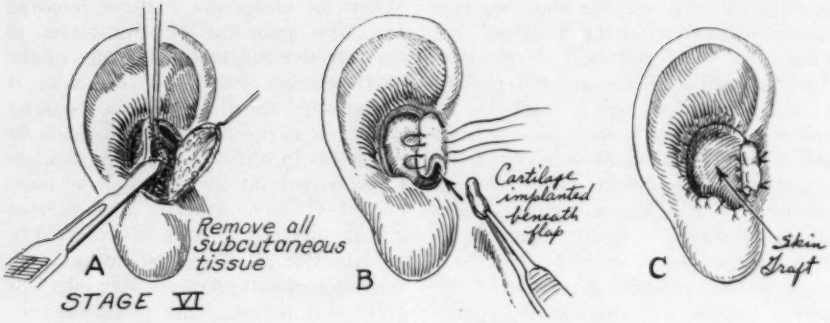


FIG. 5—Stage VI. Construction of the external auditory canal and the tragus.
(A) The flap is raised, and the subcutaneous tissues removed.
(B) The flap is folded on itself over a small cartilage implant.
(C) A skin graft applied in the new external auditory canal. The skin graft should extend inward as far as the periosteum over the mastoid bone.

SUMMARY

The stages in the construction of a new auricle in patients with unilateral congenital microtia are illustrated. A new technique employing a composite graft from the concha of the unaffected auricle for the construction of the concha of the new auricle is described. This technique provides the new auricle with an adequate degree of protrusion, and with a concha.

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DISCUSSION

EDGAR M. HOLMES, M.D., Boston: Dr. Converse is to be congratulated on this excellent presentation showing us a method which will create an ear which should be acceptable to the patient and, what is just as important, to the parents as well. The results are the crystallization of twenty-three years of operating on microtic ears. I am sure many procedures have been discarded as being unsatisfactory, so what we have seen and heard consists of the best methods he knows. The results speak for themselves. In discussing this paper, I can add little, but an emphasis on some of the points made is in order. The problem of what should be done about the hearing should also be considered.

Any surgeon who is going to attempt to create an auricle must understand fully the principles involved, and the reaction of tissue to surgical attack. He must be completely familiar with the various types of local and free grafts. He must also be able to change his planned operation if he encounters complications between stages, such as partial loss of cartilage or skin grafts. Above all, the surgeon must be meticulous as to details in his handling of tissues so that the least amount of trauma is caused, thus lessening thrombosis and tissue edema, so that healing is enhanced. We are aware that many materials may be buried in human tissues, and that sometimes they are accepted without foreign body reactions. Some foreign bodies if exposed to pressure or trauma in an avascular area are not tolerated and must be removed. This is par-

ticularly true in a reconstructed auricle where the blood supply is poor, at best, and where repeated minor trauma (particularly prolonged pressure from a pillow), is prone to occur.

I also prefer to use autogenous cartilage as a framework, for it has the best likelihood of living and retaining its desired formation. Tantalum, polyethylene and teflon have each been tried in cases in which autogenous cartilage failed, but the incidence of failure is so great that these foreign substances should not be used as a skeleton for an auricle. Reconstruction of a concha is a difficult task, for any created depression is prone to fill up and level off. A concha accentuated by a created meatus through the mastoid improves the appearance in some cases.

The problem as to what should be done relative to an individual's hearing is always paramount in the patient's or parent's mind. In the majority of these ears, there is no bony canal. There is solid bone from the tympanic plate outward to the cortex. The tympanic plate is lined with membrane which is customarily in the middle ear.

Rarely is the malleus well formed or incorporated in the mucous membrane. Usually it and the incus are markedly deformed and fused. If one were handed these bones from an operation and asked their origin, it would be difficult in certain cases to tell what they were. The auricles, meatus and ossicles are derived from the first branchial cleft and Meckel's cartilage. The rest of the middle ear, eustachian tubes, stapes and cochlea differ in derivation and are usually normal, though we do see abnormalities of the stapes, with fixation of the footplate at birth. The hearing in these cases is usually at a level of 50 to 60 decibels by air conduction, but bone conduction is normal. With these conditions, what can we expect in hearing improvement by surgery?

What will be our approach? Before endeavoring any surgical procedure, we must not only determine our hearing level, but we must also determine by roentgenographic examination the degree of pneumatization of the mastoid. If there is no pneumatization, it is most difficult to find the middle ear so that surgery may be performed on it. With a well pneumatized mastoid, it is an easy matter to find the antrum and proceed from there. If we expose the antrum and put a graft across it, there is practically no, if any, improvement in hearing. If we then expose the middle ear space, just enough to remove the malleus and incus without disturbing the rest of the middle ear chamber, and apply a skin graft so that it touches the stapes, which must be mobile, we can hope for improvement, under ideal conditions, up to the 25 to 30-decibel level. The next time I am faced with a case of this kind, I am going to endeavor to expose the lining of the tympanic plate, and to determine as best I can the function of the deformed ossicles in relation to the stapes. If they move and there is an incudostapedial joint, then I shall apply a graft over the membrane. If there is any connection between the deformed malleus and the lining to which the graft is attached, there should be fairly normal function.

I personally do not feel that an attempt to improve the hearing in a unilateral case is warranted, because we cannot bring the hearing up to the level which will truly benefit the individual with normal hearing in one ear. If, however, there is bilateral deafness, I then feel that both ears should be operated upon, if possible, in an attempt to give the patient every opportunity for improvement in function. If this is impossible to do, a bone conduction hearing aid is essential so that the individual may have sufficient hearing in order to develop intelligible speech.

DR. BELLUCCI: In general, I can say that we can confidently approach one of these cases with reasonable assurance that, as the result of this type of surgery, we will have a relatively trouble-free ear. The problem of maintaining the patent external auditory meatus has been solved, and we have one of the best opportunities we have ever had to restore hearing. Some patients will have a wet ear, which is definitely a nuisance and may require a secondary operation. The necessity of adding even one more operation to the number required for the plastic surgery should be considered carefully. The possibility of causing psychologic trauma arises with these frequent hospital admissions.

The variation in the anatomy in these cases prohibits a precise statistical analysis of hearing improvement following these techniques. The number in each case is too small. The technical problems facing the surgeon are numerous when he is considering surgical intervention in one of these cases. Before opening one of these ears he has no idea what form of reconstruction is possible, and he must be prepared to do the operation indicated as well as possible. A figure of approximately 50 per cent seems reasonable to me to use as a yardstick for measuring the possibility of obtain-

ing hearing above the 30-decibel level. Many patients who have obtained the 30-decibel level do not feel that the hearing is sufficiently improved in this ear when the hearing is normal in the other ear.

I disagree a little with Dr. Holmes, who says that we should recommend a hearing aid for some of these patients. If I were faced with a decision whether to recommend wearing a hearing aid or performing restorative surgery, there is no question in my mind that I would rather do the surgery. I must admit that there are arguments for and against this surgical procedure and on patients with unilateral involvement our decision is not based on absolute conviction. At the present time I am in favor of reserving surgical intervention for patients with bilateral involvement unless the patient has poor hearing in the other ear.

THE EFFECTS OF BURYING EPITHELIUM IN THE MIDDLE EAR OF ANIMALS: CLINICAL IMPLICATIONS

BEN T. WITHERS, M.D.

and

BEN M. NAIL, JR., M.D.
BOB R. ALFORD, M.D.
BY INVITATION

HOUSTON, TEXAS

MOTIVATION for this project was the need to find how "foreign" epithelium reacted when buried in the middle ear. Practical import relates to ensuring an air-bearing space in tympanoplasty cases and finding a simple source of footplate graft material in stapes surgery. A logical corollary was to see what happens to polyethylene tubing and Gelfoam when buried in the ear.

METHOD

Under magnification and with aseptic technique, twenty cat ears were operated upon using autogenous full-thickness skin from the abdomen and mucosa from the mouth and from the conjunctiva. "Broad spectrum" antibiotic coverage was administered for the first few postoperative days. Drum and middle ear-bulla contents were removed and grafts buried, using an external skin layer to seal off the cavity. The use of a double-layered graft with raw surface sutured to raw surface was tried in eight ears: a double layer of skin; skin with oral mucosa, and skin with conjunctiva. Seven of these eight lined grafts failed to "take," probably, as Wullstein[20] has surmised, because of interference with early vascularization of the graft when its raw surface is lined. The one which lived was skin-to-skin and resulted in cholesteatomatous material in the buried cavity. In spite of the "take," resulting infection finally caused a necrosis and slough of the whole external ear. Employment of "lined" grafts is therefore not recommended as a workable method.

Twelve ears were used for the remainder of the experiment. In these, either conjunctiva, oral mucosa or full-thickness skin from the abdomen was applied to the denuded medial wall of the middle ear-bulla, and the ear was sealed off with a skin graft. Either polyethylene tubing no. 90 or Gelfoam was also buried in four ears of the above group. The ears were reopened from six weeks to six months later and the results studied grossly under magnification and microscopically by sections.

RESULTS

The results of the latter twelve operations will be considered in more detail as a composite of each type of experiment.

The first group concerned burial of full-thickness skin from the abdomen onto the medial wall of the middle ear-bulla space. This invariably led to a "chronic" granuloma, cholesteatoma, or cholesteatomatous material with chronic infection (figs. 1 and 2). One might ex-

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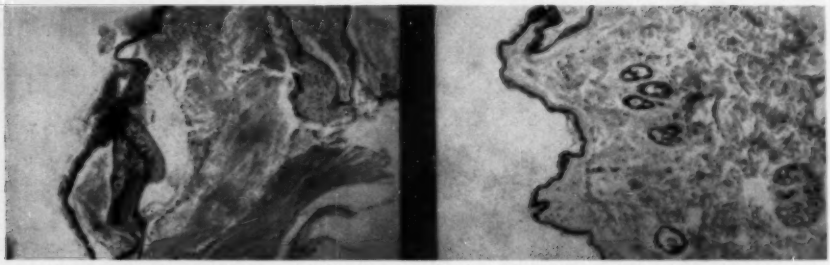

FIG. 1—(Left) Cholesteatomatous material recovered from the buried graft. (Right) Normal abdominal skin. (cat).

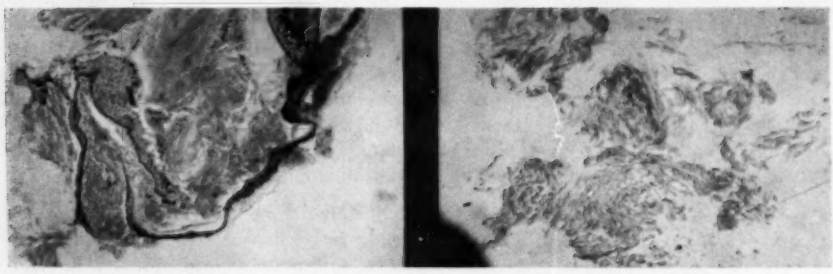

FIG. 2—Squames (right) and cholesteatomatous material (left) recovered from buried skin graft.

pect such a reaction from buried skin. The findings coincide with reported experiences of Friedman,[7] Choremis and his colleagues,[3] and Ruedi,[14] who found that implanted epidermis caused cholesteatoma. In the report of Choremis and his co-workers, accidental implantation of epidermal cells at repeated spinal puncture caused cholesteatoma formation about the spine. It would seem, then to be a bad principle to bury skin in the middle ear.

The second group concerned burial of oral mucosa, full thickness, from the buccal surface of the cheek to the denuded medial wall of the middle ear-bulla space. No effort was made to sterilize the donor area in the mouth before cutting the graft. Grossly, the reopened ears showed no sign of infection, suppuration, or cholesteatoma. They were clean, dry, air-bearing spaces. Such a result is in keeping with that expressed by Wullstein[19,20] and by Wiegand.[18] It is surprising that no infection resulted. Also in spite of layer formations of keratin by oral mucosa, no problem arose by its burial.

Microscopic sections of the buried oral mucosa indicated that it undergoes some change in the new location but continues viable as an epithelial covering. Figure 3 shows normal oral mucosa on the left with keratin, and on the right, mucosal cells from the transplanted graft. (Note especially in the crypt at the upper portion.) Figure 4 is a higher magnification of this crypt to show the squamous epithelial cells in the recovered graft.

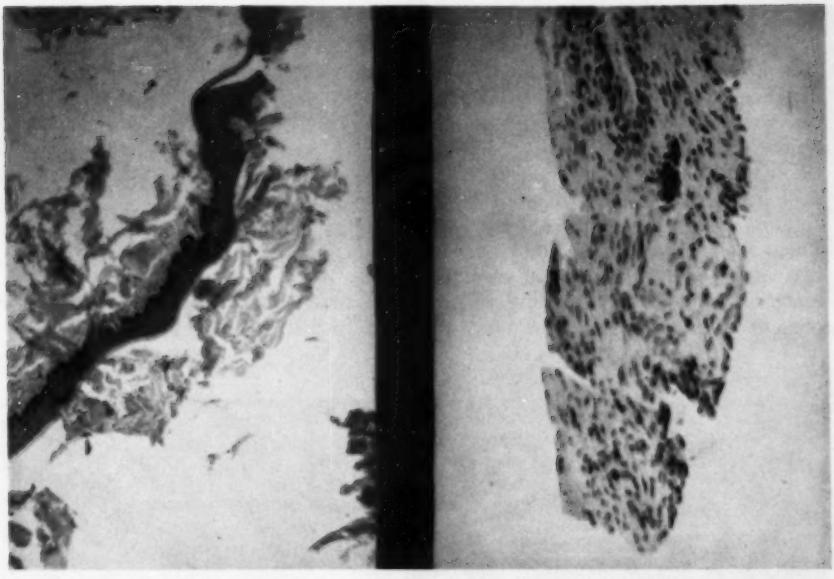

FIG. 3—(Left) Normal oral mucosa (cat). (Right) Recovered buried mucosal graft. Most representative area is in the "crypt" on right. The mucosa remains viable but undergoes slight change in the new site.

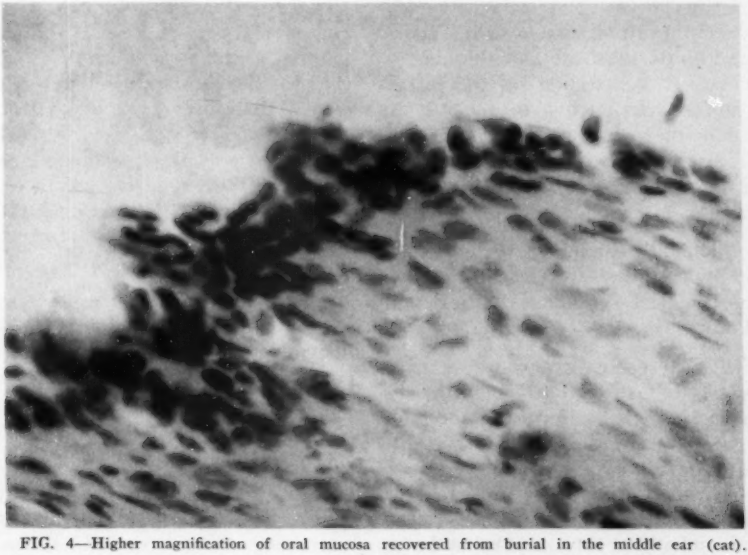

FIG. 4—Higher magnification of oral mucosa recovered from burial in the middle ear (cat).

The third group utilized autogenous conjunctival mucosa for burial on the medial bulla-middle ear wall. In this instance, also, a clean, dry, air-bearing space was evident on reopening the ear. Grossly, the conjunctiva seemed to us thinner, more elastic and more prone to drying in the handling than oral mucosa. Wullstein[20] has objected that conjunctiva undergoes considerable shrinkage and is therefore not the preferred material. One gets an inkling of this phenomenon from figure 5 in which the recovered graft section (right) shows some loss of substrate and thinning of submucosa; the section on the left is the normal conjunctiva of the cat. As noted in the preceding slides, this mucosa also undergoes some change but remains viable in the new location.

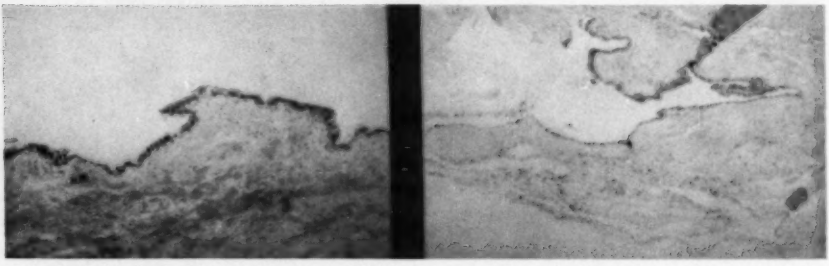

FIG. 5—(Left) Conjunctival mucosa (cat). (Right) Appearance of conjunctival mucosa after burial in the middle ear. Note thinning of submucosal area.

Conjunctiva seems a utilizable material for middle ear lining, though it apparently suffers shrinkage and may not be as practical for human purposes as oral mucosa.

The final group demonstrated what happens to Gelfoam and polyethylene catheter no. 90 when buried in the middle ear. Grossly, the Gelfoam has disappeared after six weeks to leave a non-infected air-bearing space, free of scar tissue adhesions. No sign of the material was found at that time. Several authors: L. R. House,[10] Ormerod and McLay,[11] Wiegand[18] and Wullstein[20] advocate the use of Gelfoam or equivalent material in middle ear surgery. It is the consensus that the gelatin becomes liquefied and is excreted by the eustachian tube or absorbed. Gelfoam, therefore, should be valuable as a temporary framework as well as a vehicle for nutrition, antibiotic and anti-inflammatory compounds.

Grindlay and Mann[8] have pointed out that polyethylene is polymerized ethylene similar in structural formula to paraffin, which has shorter carbon chains. Like paraffin, it is not wetted by water; therefore, there is no tendency for secretions to adhere to it and blood clotting in polyethylene tubes is greatly delayed. From extensive use in experimental surgery of dogs and guinea pigs, they concluded that polyethylene is well tolerated by living tissue.

Shambaugh[17] in his new text speaks of the possible place of polyethylene in tympanoplasty. He further describes good results obtained by burying a polyethylene catheter in his myringo-malleo-labyrinthopexy operation for restoring serviceable hearing in otosclerosis.

With reference to buried polyethylene catheter no. 90 in our experiments, an interesting thing occurred. When the

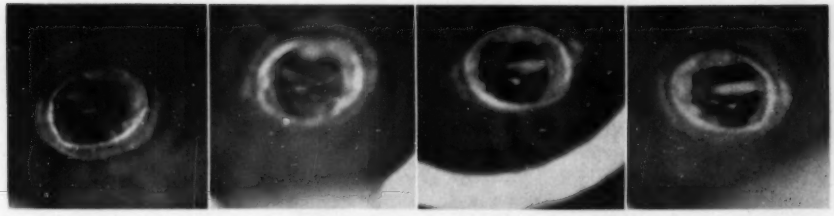

FIG. 6—Surgical microscopic view of buried polyethylene catheter with covering membrane shown stripped away in the successive views from left to right.

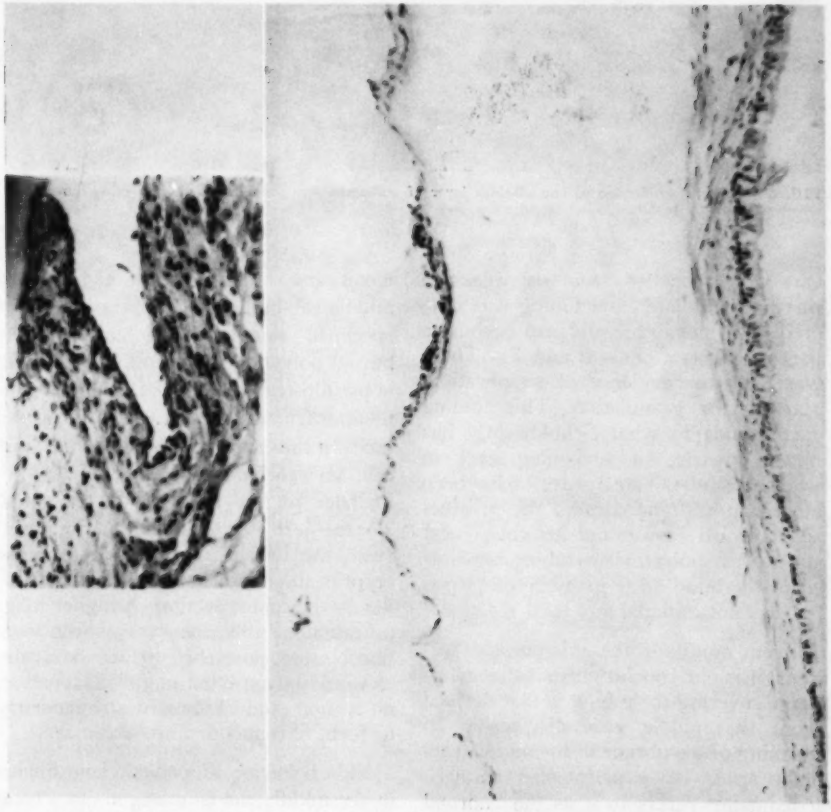

FIG. 7—(Left) Endothelial-like membrane found covering buried polyethylene tubing. (Center) Normal endothelial-like membrane from cat's middle ear-bulla space. (Right) Ciliated epithelium from same cavity but near eustachian tube.

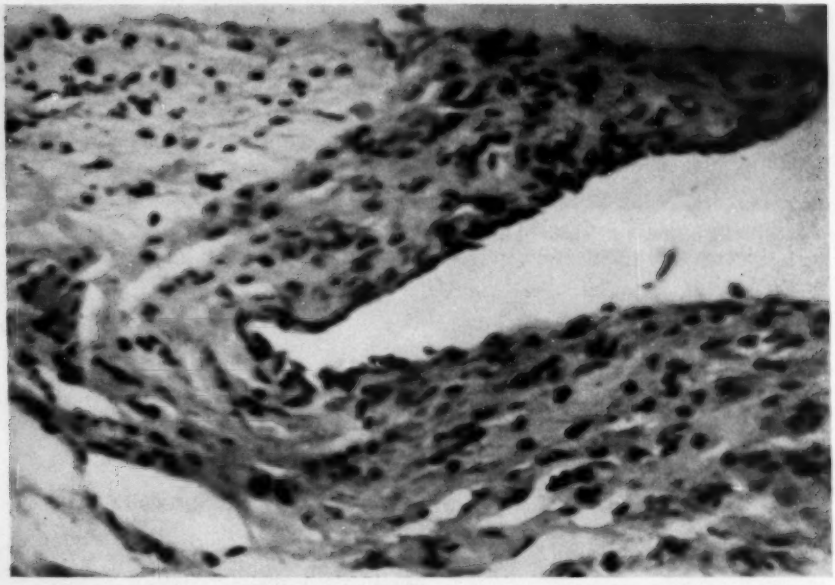

FIG. 8—Higher magnification of one-cell-thick layer of endothelial-like membrane found covering buried polyethylene tubing. Fibroblasts noted in adjacent area.

ears were reopened from six weeks to three months later, the tubing was covered with membrane and had become a part of the ear (figs. 6 and 7). There was no gross evidence of suppuration, scarring, or granulation. This finding corresponds to what Schuknecht[16] has noted, grossly, in reopening ears in which stainless steel wire has been buried: membrane covered the prosthesis. Howard House and his colleagues[9] stated, ". . . polyethylene tubing implanted in the middle ear in numerous cases . . . has not initiated any local reaction."

From study of the microscopic sections, it is our conclusion that this membrane covering the tubing is that derived from the middle ear-bulla space. In speaking of membrane in the middle ear-bulla space of experimental animals, Friedmann[6] refers to it as the "normal flat endothelial-like lining." In our figure 7, we have grouped for comparison, membrane samples from the normal middle ear-bulla area of the cat and the specimen sample found covering the buried polyethylene tubing. To the right is pseudostratified ciliated columnar epithelium from an area near the eustachian tube. In the center is the low, almost one cell, endothelial-like lining of the remainder of the bulla-middle ear area. To the left is the membrane removed from the buried foreign body. In the crypt is an endothelial-like covering similar to the center section. A higher magnification of this one area shows some fibroblasts below the surface covering, as would be expected (fig. 8). However, no section studied showed any tendency to form fibromas or fibrosarcomas.

This behavior of polyethylene buried in the middle ear is analogous to Pressman and Simon's observations[12] when they used it as tracheal transplants. They

found in dogs that the polyethylene graft segment became lined with tracheal mucosa. They stated that the mucosa at first was thin and nonciliated, but it eventually became stratified, columnar and ciliated like the tracheal mucosa adjacent to it. This occurred after a varying period of months.

One might conclude that polyethylene transplanted to the ear is well tolerated, becomes walled-off by membrane as an integral part of the ear, and incites no immediate infection, fibroma or fibrosarcomatous change. However, this was a situation in which no motion of the implant was entailed. Both Grindlay[8] and Pressman[12] mentioned granulation tissue forming at the ends of polyethylene implants, where there was movement. Possibly the movement and not the material was responsible; however, whether polyethylene as a "moving part" implanted to the middle ear is satisfactory cannot be concluded from our experiments. We hope to ascertain this fact in subsequent studies.

CONCLUSIONS

(Based on the study of twenty cat ears using buried autogenous grafts.)

1. Use of a double layer of skin; skin with oral mucosa; or skin with conjunctiva; placed raw-surface-to-raw-surface to seal off the middle ear cavity was unsuccessful. Apparently early circulation to the composite graft was not adequate.

2. Skin when buried in the middle ear-bulla space produced chronic infection and cholesteatomatous material and is therefore not suitable to line a newly constructed middle ear.

3. Oral or conjunctival mucosa, while undergoing slight change, remained viable when buried and resulted in a non-infected, air-bearing space (though the latter material was prone to shrinkage).

4. Gelfoam was apparently absorbed from the middle ear and caused no ill effect.

5. Polyethylene tubing no. 90, when buried in the middle ear-bulla space, became covered by membrane and incited no evident infection, scarring or tumor formation. This was in a situation where no motion of the implant was required.

ACKNOWLEDGEMENTS

We gratefully acknowledge the kind assistance rendered by Dr. Stuart A. Wallace, Professor of Pathology, Baylor University College of Medicine, Houston, Texas, in interpretation of the gross findings and microscopic tissue sections. In addition, we extend our thanks to Dr. N. Rex Lewis, Hermann Hospital Pathology Department, Houston, Texas, whose knowledge of photomicroscopy made the pictures possible.

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DISCUSSION

JAMES W. MCLAURIN, M.D., Baton Rouge, Louisiana: Our experiments on the use of vein grafts and polyethylene in cats are still incomplete, so we cannot add any basic information to the report by Dr. Withers and his associates. We have made certain other observations, however, which may be of interest.

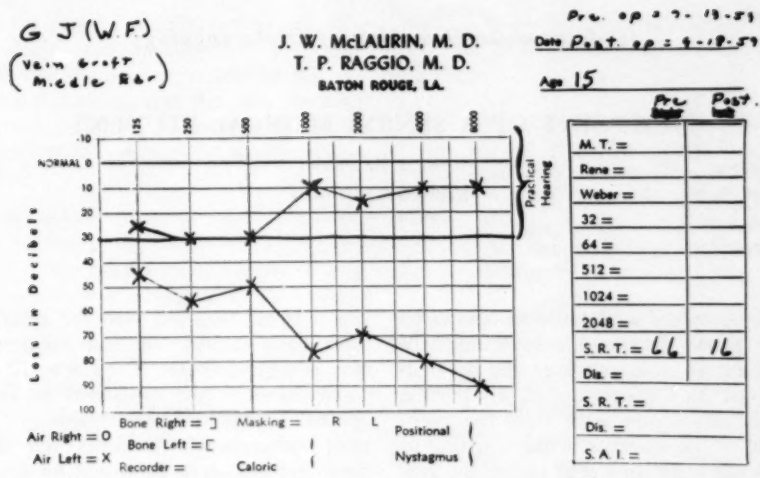
We have had no success with oral mucosa. In the two primary or one-stage tympanoplasties in which we used it, the mucosa was thick and we had difficulty positioning it properly. This is probably why the eustachian tube became obstructed by invagination of the graft, which went on to necrosis and secondary infection. Perhaps a good result might be obtained in primary tympanoplasty if the oral mucosa could be so carefully and precisely placed that there was no possible chance for it to obstruct the tube and if the operation was done by the cavum minor technique.

In a two-stage tympanoplasty, the mucosa was placed in the middle ear at the first operation. Then, some four months later, when it had thinned out and the eustachian tube was patent, the operation was completed. The postoperative audiogram showed no improvement over the preoperative audiogram.

We had better results by the use of a vein graft in a primary one-stage tympanoplasty. (In the accompanying audiogram, the lower curve is the preoperative threshold and the upper one is the postoperative threshold.) We plan to use this technique in the future when it is necessary to remove infected mucosa and use a graft over the middle ear.

We now use full-thickness skin grafts routinely whenever a skin graft is necessary. In a number of instances, cholesteatoma formation occurred months after we had regarded tympanoplasties as successful, and we have come to believe that this complication is a possibility whenever split-thickness or three-fourths-thickness skin is used and hair follicles and glands are cut across.

When Gelfoam is used in the middle ear, it should be well soaked in antibiotic-hyaluronidase solution, so that it will have the consistency of mucus. Otherwise, it might not be cleared through the eustachian tube and the subsequent foreign body reaction could prevent a good result.



I am somewhat dubious concerning the use of polyethylene in the middle ear. I doubt that from six to twelve weeks is long enough to rule out a possible carcinogenic influence. I also wonder what happens to polyethylene if the ear later becomes infected.

As you know, other specialists have discontinued the use of this type of material for prosthetic purposes, and I am inclined to think that otologists will also be abandoning it in the not-so-distant future. The statement which appears on polyethylene tubing that it is "animal-tested" furnishes no hint of whose standards were used for testing or what the standards were. If we are to continue to use this material in the middle ear, then some group with authority, such as the Academy, should lay down specifications for these tests. For myself, I have never used it without real misgiving, and I would prefer to rely on tantalum or steel wire rather than polyethylene.

It was a privilege to discuss Dr. Withers' illuminating report. I am sure that in the years to come it will be referred to as a basic piece of work in this type of otologic surgery.

HAROLD F. SCHUKNECHT, M.D., Detroit: Dr. Withers has found that a thin layer of mucosa grows to cover the polyethylene struts introduced into the auditory bulla of the cat. We have found the same covering layer of epithelium in animals in which tantalum wire had been introduced into the middle ear cavity. We have termed this lining the "mucosal sheath."

Dr. Colman performed an experiment in our laboratory, one phase of which was the introduction of free grafts of skin over the oval window following stapedectomy. He found the development of a pathologic condition identical to that which has been described by Dr. Withers. There was proliferation of the squamous epithelium to form cysts, which then increased in size until one of them actually perforated through the tympanic membrane and another herniated through the oval window into the vestibule.

Dr. Withers' experiment would be of even more value if he had performed serial sections of the temporal bones with the grafts *in situ*. This would allow him to study the histopathologic features of the grafts in anatomic relationship to the host areas.

Undergraduate Teaching of Otolaryngology

VIEWPOINT OF A SENIOR MEDICAL STUDENT

JOSEPH B. SERRA
DETROIT, MICHIGAN
BY INVITATION

IT is, indeed a pleasure to appear on this panel discussion concerning the teaching of otolaryngology and ophthalmology. As I understand it, my portion of the discussion is to state the viewpoint of the students in the teaching of these subjects. In order to get the students' viewpoint, I sent out 46 questionnaires to local chapter presidents of the Student American Medical Association at member schools. I received 22 replies, and from these have drawn my material for this discussion.

Although I received only a 50 per cent return on these questionnaires, I do feel that they represent a wide variance of conditions in the several schools as well as opinions of individual students. I will first read the question and then follow with a general discussion based on the answers received. At the end I will attempt to draw conclusions.

The first question asked of the students was: *How does the teaching of these subjects compare with that of other subjects in your curriculum?*

By "these subjects" I meant that I wanted them to answer for both ophthalmology and otolaryngology. This was a broad question, and the answers were quite varied. The indication was that as a general rule, from 8 to 12 didactic lectures are conducted in both ophthalmology and otolaryngology. In most instances the students felt that these lectures were good and on a par with other comparative courses in the "so-called" surgical subspecialties. In two instances the lectures were conducted by visiting practitioners; the students complained of unorganized lectures and a good deal of repetition.

In many schools, ophthalmology is included in the course on physical diagnosis. The students are taught how to handle the ophthalmoscope in examination of the retina in correlation with the diseases of diabetes and hypertension, to mention only two.

As far as clinical experience is concerned, the answers received must be viewed in light of the fact that individual medical schools vary in the caliber of their staffs, in the ratio of full-time to part-time and visiting teachers, and in clinical facilities available for teaching purposes. The amount of time spent in clinics ranged from none at all in one case to fifteen 3-hour clinics in another. In two instances, otolaryngology is offered as an elective in the senior year, lasting approximately three and one-half to seven weeks; but as an elective, it competes with many other electives which many students would rather take,

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From Wayne State University School of Medicine, Detroit.

such as general practitioner externship, radiology, and orthopedics. In these cases, the opinion expressed by the answering students was that the teaching received is rather inadequate unless he chooses otolaryngology as an elective.

The second question asked was: *Do you feel that the students get enough out of otolaryngology and ophthalmology to justify their inclusion in the curriculum?*

The answer to this question was "yes" on practically all of the questionnaires. Many of the students polled commented on the fact that a good percentage of the cases seen by the general practitioner fall within the realm of otolaryngology and ophthalmology. My fellow students and I agree that there is definitely a place for otolaryngology and ophthalmology in our curriculum. The consensus is that more time should be spent on actual clinical experience. I hasten to add that this clinical experience must be well supervised to make it of value.

The third question asked was: *What techniques are most valuable to the student?*

In most cases, my colleagues felt that the practical experience gained in the clinic was most useful. Learning how to use the mirror, otoscope, and ophthalmoscope were very high on the list. In most cases, the didactic material was considered valuable but, as one student put it, "It's always better to see just how much can be visualized in an examination rather than taking someone else's word for it."

One factor mentioned in relation to clinical work was that of supervision. This is very important, since without adequate supervision and instruction, the hours spent in the clinic may lead to the formation of bad habits and also a waste of time.

One method which seemed appealing to me, as far as clinical work is concerned, is a clinic which lasts two and one-half hours followed by a half-hour discussion period of interesting cases seen that day or a lecture on some pertinent problem.

Audio-visual aids were mentioned as being beneficial in teaching techniques.

Another idea mentioned was that more time should be spent in the simple instruction of how to remove foreign bodies from the eye, ear, nose and throat. The students feel that this is important regardless of what field you happen to choose later on.

The fourth question asked was: *Do you learn to do a satisfactory examination of the eye, ear, nose and throat?*

As is true in any examination, one must go through a systematic study of the part being examined. One of the most important aspects of any examination is being able to recognize the normal appearance so as to differentiate it from the pathological. In the examination of the eye, ear, nose and throat, one must become familiar with the use of the instruments used. Every medical student, regardless of his future plans, should be able to do an adequate eye, ear, nose and throat examination and to recognize, at least, what is normal and what is pathological.

The general consensus among my fellow students is that they do learn to do a satisfactory examination as far as fundamentals are concerned, but efficient, skillful and practical application rests entirely upon the individual. My point is that in most schools polled, the material is presented and the opportunities

are available. Whether the student learns to do an adequate examination or not is mainly an individual matter.

The fifth question asked was: *Is the material correlated with that of other medical subjects you study?*

I will not spend much time on the answers to this question. In all cases the answer was "yes," though in varying degrees. This question, for all practical purposes, proved to be of little constructive value, since otolaryngology and ophthalmology, as a part of clinical medicine, must necessarily be correlated directly or indirectly with other courses studied.

This is the extent of the questionnaire that was sent out. From it I have drawn the following conclusions:

1. The majority of the replies expressed the opinion that more time should be devoted to clinical experience and discussion of actual cases, even at the expense of decreasing the time devoted to didactic lectures. Several of the respondents felt that these didactic lectures were inadequately prepared.

2. Learning to handle the basic instruments adequately is important to the student. This instruction should not be neglected by the teaching staff.

3. The time factor is of prime importance. The time necessary to cover adequately the various courses in the curriculum is not available. The fact that clinical experience in otolaryngology is an elective in some schools points up this fact.

Along the same lines, I should like to relate a story told to me by Dr. Crowshore of Wayne State University. Not long ago the dean of our medical school polled the department heads concerning the amount of time they would like to have for the teaching of their various courses. When the indicated hours were totaled, it was found that approximately one and one-half years would have to be added to the present four-year medical school course in order to accommodate their program. I think that gives you some idea of the scope of the problem our teachers are facing.

Although there were specific complaints, and I think these complaints should be considered, the general opinion is that the student, if he has applied himself and taken advantage of the material presented, can adequately do these examinations in otolaryngology and ophthalmology.

Undergraduate Teaching of Otolaryngology

VIEWPOINT OF A DEAN

ROBERT B. HOWARD, M.D.
MINNEAPOLIS, MINNESOTA
BY INVITATION

I AM grateful for the opportunity to speak on this subject. You will understand, I am sure, what I mean when I say that I feel "on the spot." Obviously, of the four people who make up the panel, the dean is the one who certainly knows the least about otolaryngology and ophthalmology unless, of course, he happens to be Dr. Furstenberg.

I want to make clear, too, that in presenting this viewpoint I cannot speak for other deans. It represents the Minnesota viewpoint, and we have been very fortunate over the years in having very good and very strong teaching programs in both otolaryngology and ophthalmology. My views are colored by this factor, I am sure.

Whatever contribution I can make relates to a general consideration of the curriculum rather than to special considerations of ophthalmology and otolaryngology.

I need not trace the development of the specialties in medicine. All of you know as much about this as I do, or more. Specialties and subspecialties have arisen within your own fields. You are aware of them, and you know that as specialties have developed and have been further established, curriculum accommodation has taken place in the nation's medical schools. In effecting curriculum accommodation, I think we have been hampered by a rather finite concept of medical education. We have thought of it in somewhat the same terms as were true a half century ago — a period of training, the result of which was the trained doctor. We have thought in terms of "exposure" to each of the various specialties, and we have deemed them essential.

Chance, local politics, and a host of extraneous factors participate in determining the respective amounts of time to be assigned to each subject. Certainly neither the wisest physician nor the most learned and most objective group of physicians can really define the importance of one special area in relation to another, in terms of percentage of time and absolute number of hours.

As medicine has grown, these foregoing considerations concerning our curriculum accommodation have resulted in the "postage stamp" approach, whereby new subjects are simply "pasted on" or fitted into the old curriculum. The result of this can be illustrated by our own senior year program, which is a remarkable example of the fragmentation of time and of confused and confusing scheduling. How can we avoid cluttering up the minds of these students if we clutter up their lives in this way. What can we do about this?

Dean of the University of Minnesota Medical School, Minneapolis.

Presented at the *Special Program* of the Teachers' Sections: Ophthalmology and Otolaryngology at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

First of all, I feel that we must put aside all remnants of the old, finite concepts of medical training. We must, in fact and in deed, accept the concept of medical education as an experience in true graduate education. We must accept medical education as a life-long process for which the four years in medical school lay only the groundwork.

With medicine as complex as it is, what can we expect of our students in four years' time? Obviously, we expect them to acquire the basic vocabulary of their profession. We expect them to acquire a sound and thorough knowledge of the basic medical sciences. We expect them to have a thorough indoctrination in the approach to clinical medicine and a knowledge of the basic principles of clinical medicine. We want them to have a knowledge of the services available from the various paramedical groups and how these services may be used. Above all, we hope that they will be indoctrinated with curiosity, a spirit of inquiry, and a capacity for critical thought that will guide them through the rest of their professional careers; that they will be healthy skeptics; that they will be proof against the detail man's blandishments after they enter practice.

How do we accomplish this? Again, my familiarity is with our program at the University of Minnesota, and my remarks will be in relation to the curriculum there.

First of all, we are making some minor changes in our basic science years. With regard to clinical years, we are thinking of a junior-senior biennium, a period of two years which will be divided into block time segments for medicine, surgery, pediatrics, psychiatry and neurology, and obstetrics and gynecology. In addition, a six-month segment will be devoted to the Comprehensive Clinic Program and three-month segments to electives and to free time.

As you can see, this is a much more flexible program in the clinical years, with the emphasis on fundamental principles. Where do the specialties fit into such a program? First, they fit into the teaching of the basic sciences, and I think the various specialties should participate in the teaching of the basic sciences in the area in which they have a special interest.

Second, they must participate to a very large extent in physical diagnosis. Mr. Serra emphasized this as something the students are interested in. I certainly subscribe to this. We must put more emphasis on physical diagnosis.

Clinical teaching, we believe, must be part of an integrated whole. Specialty participation in this program will be carried out in such a manner that the relation of the specialty to the whole is made evident. Specialties, of course, will continue to have strong graduate and postgraduate programs, in keeping with the concept of medicine as a continual process of education, not as a finite four-year period.

What will happen to ophthalmology and otolaryngology under these proposed changes in our school? I hope there will be some increased participation in basic science teaching. There definitely will be increased participation in physical diagnosis. Participation in formal didactic lectures will be essentially as it has been in the past with no over-all time change. Some of you may possibly be interested in one of the implications of the junior-senior biennium scheme. Lectures will be given every two years to the combined group of third and fourth year students. Thus, lecture time for the student will be the same, but the various clinical faculty members will carry out lecture series

only half as frequently as they have before.

Clinical undergraduate teaching will take place largely through the outpatient department, as part of the Comprehensive Clinic Program, with students following their patients from the intake clinic to the various special clinics for consultation. We recognize, under a scheme of this sort, the need for a very able director with broad interests, who will devote most of his efforts to the overseeing of instruction of medical students in this program.

There will be a concentrated experience in these specialties for some students during the elective and/or the free-time segments of our program. Some of them will then have the chance of spending perhaps as long as three months in ophthalmology or otolaryngology or other areas of their special choice.

Then, of course, there will continue to be a strong graduate and postgraduate program.

Now, I have to admit that such an approach will result in some students having less time in otolaryngology and in ophthalmology than formerly was the case, but on the other hand, some will get a much longer and a much more meaningful experience in these areas. I feel that the time has come when we must recognize that all students do not get exactly the same "exposures" during the four years of undergraduate medical school. This is entirely compatible with the concept of the continuum of medical education. The student who has been properly taught, but finds he has fallen short of time for a needed specialty, will get this additional knowledge in one way or another. We must concede that there are some students who by virtue of the development of other unrelated interests, may not need to have extensive knowledge in certain of the special areas.

In our institution, this program will be advantageous to the teaching of ophthalmology and otolaryngology in the long run. There certainly will be the opportunity to give some extensive and meaningful experiences to our students. These subjects will be allowed just about as much time as other fields, but its distribution will be a little different.

Undergraduate Teaching of Otolaryngology

VIEWPOINT OF A GENERAL PRACTITIONER

RALPH E. CROSS, M.D.
JOHNSON CITY, TENNESSEE

BY INVITATION

To present a discussion of this type, indeed, presents a difficulty, and many of the problems which I shall enumerate probably have been adjusted since I attended medical school some years ago.

It was very interesting to hear the panelist representing the medical student give his view on graduate teaching. There may be some repetition because those of us in general practice like to think that we are students also.

The subject of undergraduate teaching in otolaryngology (and I shall include ophthalmology) certainly presents many interesting points for the panelists here. I shall use the abbreviation EENT in referring to these two subjects. I shall endeavor to enumerate the principal items that we desire to see included in undergraduate teaching which perhaps may be known better to me now after having been in general practice for these years. I know that my views have changed considerably from those oftentimes expressed as a medical student. I have found that many of the things that we as students thought to be of no value have become very important to me in the practice of medicine.

Students are always being taught in medical school what to do, but I think that it is very important in EENT to delineate carefully for the students those areas in which they can easily get into serious trouble. The purpose is not to scare them but to give them some idea of those conditions that require immediate referral and/or hospitalization. It is too easy to go wrong too fast in EENT.

In answering the questions posed by Dr. Kirchner, I have expressed my views as a man doing general practice and they are not necessarily the policy of the American Academy of General Practice. Many general practitioners do work in eye, ear, nose and throat by necessity rather than by choice; consequently they must have adequate training at the undergraduate level as well as continuous training at the postgraduate level. The men doing general practice do not wish to take over EENT but to continue to treat cases with specialized consultation and assistance.

In answer to the question *Are otolaryngology and ophthalmology as taught in medical school of any value to the general practitioner?* I would say, "Yes, it is of value." But, it could be made of more value by these three points:

First, less instruction in the highly specialized phases of these two fields. The time allowed in medical school is barely enough to initiate the neophyte to the basic fundamentals of otolaryn-

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gology and ophthalmology, and there should certainly be more time and more training in these two fields.

Second, by the integration of the more commonplace and practical phases of these two subjects into the curricula of the other fields of medicine, such as general surgery, general medicine, pediatrics, not to mention obstetrics and gynecology. Careful attention should be given in each of these major fields to see that the problems of EENT diagnosis and treatment are properly taught, since it is in these fields that the student will pick up most of his lasting habits.

Third, devotion of more time to these two subjects. Because of the increased teaching in general surgery, medicine, pediatrics and other specialties, there has been an increase of time in these fields with a resulting decrease in time devoted to otolaryngology and ophthalmology.

I should like to point out that by necessity the majority of patients seen by general practitioners are people with upper respiratory infections. We know that EENT problems in general practice occur for the most part as the complication of these conditions rather than the presenting complaint. I have in mind the middle ear infections in children without tonsillitis that occur with some frequency. The general practitioner needs to be prepared to meet these problems with a basic knowledge in these two fields.

The general practitioner sees the greatest number of preschool children. He delivers more babies. He is in a position where he must thoroughly recognize defects, whether congenital or mechanical, and see that corrective measures are instituted at an early age.

The other question asked was *Do you think that more or less EENT should be given in undergraduate teaching?* Again I reiterate that we would like to have more teaching in line with the commonplace, practical conditions that we meet every day. The didactic work in otolaryngology and ophthalmology should certainly be followed closely by experience in the EENT clinics. I must say that until the student has had these subjects, the basic anatomy and physiology in these two fields is somewhat hazy in his mind. I, therefore, feel that the normal as well as the abnormal must be well studied. Anatomy, in particular, is important in these two fields, and I feel that critical review of it didactically at the time the student takes the course is of extreme importance to him.

One of the most difficult things for the general practitioner often is to separate the normal from the abnormal in EENT, and this is certainly of prime importance in his practice. It has been aptly stated by a man doing general practice that there would be no need for ophthalmologists were it possible for the general practitioner to recognize glaucoma early when treatment is of benefit.

We are asked, "Does the general practitioner do EENT by necessity or by desire?" It seems to me there is a shortage of men in both of these fields. They are extremely busy. So it is true that the average general practitioner does EENT by necessity rather than by choice.

To me it is very important that the undergraduate education of students going into general practice should include the use of the laryngeal mirror for the examination of the larynx and nasopharynx, examination of the nares with the speculum, and transillumination of the sphenomaxillary sinuses. The student should be able to recognize a lesion on the larynx, not to classify it but to recognize the abnormality.

The ophthalmoscope is certainly one of the most important diagnostic tools in medicine today. Every student should recognize the normal and the abnormal in using the ophthalmoscope at the time he graduates from medical school. He should certainly recognize the different conditions causing red eye, and the differential of external diseases of the eyes, and he should know something definite about their treatment. He will treat a great many superficial foreign bodies in the eye in general practice. He needs to know why this is a serious condition and what to do.

It would seem to me that tonometry should be taught every medical student and that he should be familiar with its correct use.

The basic anatomy and physiology of the eye should be reviewed didactically for the student.

Another question is, "How much time does a general practitioner devote to the eyes, ears, nose and throat?" I should like to answer this by some statistics taken from a study made by the American Academy of General Practice. This was a professional study of its members, and while I know that statistics are boring, having no slides I shall give the figures in round numbers so that we may get the over-all picture of how much eye, ear, nose and throat general practitioners are doing.

Five thousand one hundred and ninety-four questionnaires were mailed, and of the usable returns, 2,084 were analyzed. This question was asked, "In a typical week how many times do you render service to patients in each of the following: (The specialties were enumerated.) In otolaryngology these figures were returned. The United States was divided into New England, Middle Atlantic, Mountain, Pacific, etc. In the New England states 80 per cent of the doctors questioned, did otolaryngology, this ranged to 85 per cent in the Pacific area. Of this number, 30 per cent saw one to four patients per week, 24 per cent saw five to nine patients per week, and 46 per cent saw 10 or more patients per week, with a total projected service of 142,000.

In ophthalmology this question was asked, "In a typical week how many times do you render professional service to patients with eye conditions?" Here the range was from 59 per cent in the New England states to 82 per cent in the South Central states. Seventy per cent saw one to four patients per week, and 30 per cent saw five or more patients per week, with a total projected service of 44,000.

These statistics bring to focus these points: General practitioners are seeing eye, ear, nose and throat problems. Teaching in undergraduate schools must be pointed to the emergencies that arise in these two fields. It would, indeed, be difficult for the general practitioner to function without a basic knowledge in these two fields. He must recognize the normal and make arrangements for the care of the abnormal because many are beyond the scope of his ability.

This making of arrangements brings to mind the story of the old sheik who had 56 wives. He found that taking care of these wives and their many problems had become quite a burden. So after much thought and deliberation he decided to hire a young eunuch who would keep watch over his flock of 56 wives. Wives that needed attention were referred to the sheik for proper care. This proceeded for a number of years, but the eunuch died at the age of 41, while the old sheik lived to the ripe old age of 93.

This story has a moral, and it is this: It is not the actual work that kills you; it is making those necessary arrange-

ments. The lives of some general practitioners are like that of the eunuch—making arrangements for the specialized care of patients.

But on the more serious side, we have heard how we can better prepare the undergraduate students, and we are interested in this, but we are also very much interested in postgraduate education. We would like to see more postgraduate training in the everyday problems in otolaryngology and ophthalmology. I hope to see the day when a man going into general practice will have two years of hospital training and continue postgraduate instruction every year after entering practice.

Undergraduate Teaching of Otolaryngology

VIEWPOINT OF AN OTOLARYNGOLOGIST

GORDON D. HOOPLE, M.D.
SYRACUSE, NEW YORK

No otolaryngologist can be proud of the record of undergraduate teaching of his specialty in the medical schools of the United States. There is an obvious reason for this. There is no uniformity in the quality of or in the time devoted to such teaching. A survey made three years ago revealed that the time devoted to undergraduate teaching of otolaryngology varied from a total of 16 hours to 136 hours. I have learned since that the University of Washington, in the state of Washington, has only four hours of teaching of otolaryngology, and that the State University of Florida in Gainesville, Florida, has no department of otolaryngology. I have learned of another school that has only eight hours of teaching of otolaryngology. A number of the departments of otolaryngology reported that they were allowed between 40 and 50 hours for their undergraduate teaching program, but of the others there were more schools which were allowed fewer than 50 hours than there were schools which had more than 50 hours.

Nearly ten years ago, a committee of the Teachers' Section of the Academy was appointed to study what they would consider a minimum program for the undergraduate teaching of otolaryngology. They drew up a schedule which totaled 48 hours, reported their findings to this section, and this report received the Section's approval. Copies of the report were sent to the deans and to the heads of the departments of otolaryngology of all the medical schools in the United States. Some honest efforts on the part of a few heads of departments were made to improve the situation in their own institutions. I have been told about some of the resistance which these men met. Others never did a thing about it. Now, half a dozen years later, the conditions cited above are still in operation. If you are proud of this record, I am not.

So much for the quantity of teaching. What about quality? The picture, as I see it, isn't any brighter. I have served at national board examinations and have seen medical students trying to look into a nose with the help of a nasal speculum and the use of a Welch Allyn otoscope (without an ear speculum) as the source of light. Obviously they had not been taught even the fundamentals of nasal examination. One conjectures on how much instruction in really vital otolaryngology they had been given. I hope that I am wrong, but I feel that with the increasing pressures of graduate teaching, the situation is worsening. With the increase in the length of the training period of the graduate student in otolaryngology, there are more demands upon the time of our teachers. Our numbers are not growing; hence

Presented at the *Special Program* of the Teachers' Sections: Ophthalmology and Otolaryngology at the Sixty-Fourth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 11-16, 1959, Chicago.

the slackening is in undergraduate teaching. The graduate student must eventually pass an examination. It seems as though no one cares how much the undergraduate is taught.

All of this sounds as though I am a defeatist and that I am ready to throw in the sponge. Not at all. I am a firm believer in the strategy of attack when the enemy has you on the run. But I do not believe in attacking just to confuse the enemy. There should be sound reasoning behind such a move. I beg your attention for a few minutes and ask you to judge whether or not the following reasoning is sound:

All of you know that otolaryngology is in a state of transition. The reasons are well known. In brief, they are three:

1. The advent of the antibiotics
2. The new discoveries in otology
3. The new emphasis on head and neck surgery.

(There are other reasons but these will suffice.)

Rightly or wrongly, and time alone will tell which, the American Board of Otolaryngology has ruled that there must be more emphasis on surgery in graduate training and the total time spent in such training must be four years.

There have been reactions to these rulings. Some of these have been in strong support of the change; others are against the move. If one looks for a common reason behind these objections, it is this: With this lengthened training there will be fewer men wishing to make otolaryngology their specialty, and thus there will be a shortage of otolaryngologists in the country. The opponents further note that there is a shortage in existence right now. I should like to ask the question: Is there a shortage?

I have known for years that in Britain there were fewer otolaryngologists per million of population than there are in the United States. I have long wondered about this. But with my wonderment, I heard no comments about a shortage of otolaryngologic coverage for the people of Britain. It does not appear to exist. This has puzzled me.

While in England last summer, I visited Terence Cawthorne, known to many of you as the leading otologist in the British Isles. I asked him how many certified otolaryngologists there were in Great Britain. He told me there were about 330.

The population of the United States is about 175,000,000; approximately three and one-half times that of Great Britain. This means that if the United States had the same proportion of otolaryngologists to the population as in Britain, we would have only 1200 diplomates in otolaryngology. We have about 4,000 otolaryngologists or about three times as many in proportion to our population. Why the difference?

Because I was thinking of today's symposium, I asked Mr. Cawthorne, "How many hours are given for the undergraduate teaching of otolaryngology in your medical school?"

Imagine my surprise when he said, "We average about 150 hours for this kind of teaching." I have since learned from Mr. Gray, who is here from Sheffield, that all of the schools do not have as high a number of hours as this.

One hundred and fifty hours, and in the United States the top school allows only 136 hours! What a difference, I thought! Then came the awakening. With about three times the amount of training that we give our undergraduates in medicine, the general practitioners of the British Isles are caring for the minor otolaryngologic needs of the population, leaving the more intricate and major procedures to the lesser percentage of specialists.

I tried to get like figures for France, Germany, Sweden and other countries. I sent letters three weeks ago, and I have not heard officially. But unofficially the percentage of otolaryngologists per population in those countries is similar to that of the United Kingdom.

I wonder if we should be taking steps in the direction of more undergraduate training during this period of transition in otolaryngology. Should we propose 150 hours of undergraduate teaching in otolaryngology to the medical schools of this country in order that future general practitioners will be better trained in minor otolaryngologic procedures? It is impossible to train enough otolaryngologists to spray all the noses which need spraying, to remove all the wax that needs removing, and to care for all the quinsies and all the Vincent anginas that need help. Oh! I forgot, in these antibiotic days these things don't exist. But maybe that supports in some degree what I am proposing.

On the other side of the fence, I am sure a man well-trained in modern otolaryngology, which covers such a broad field, will not be content to live in a town of 10,000 to 15,000 and see one malignant lesion of the throat or one case of otosclerosis per year. If we cannot train enough men, and if the men we train will not limit the field of their practice to the smaller communities, we are in a dilemma unless we make some new moves. An increased training in otolaryngology for general practitioners seems to me to be the answer, and obviously this training must come in the undergraduate years.

Where is the additional time to be found? Each branch of medicine is demanding more time in the undergraduate curriculum. I would suggest that another hard look at medical college curricula would not be amiss.

Mr. Cawthorne made a remark to me which I have pondered ever since. He said, "The curricula of medical schools are based on the autopsy table when they should be based on the morbidity table."

To date no one has come up with any evidence to refute the reports of Lierle, Boies, myself and others, that 25 per cent of a general practitioner's work is otolaryngologic. There are approximately 3200 hours of undergraduate clinical teaching in our medical schools. Does it make sense that the subject which takes up 25 per cent of a practicing physician's time has only about 1.5 per cent of all clinical teaching time allotted to it?

Are we ready for such a move? The answer is no, for we do not have a sufficient number of qualified teachers. However, it is significant that at this very time the National Institute of Health, with many millions of dollars backing the effort, is launched on a campaign to increase the number of *qualified* teachers in otolaryngology. This move, which will take more than three or four years in the making, could well be coordinated with the suggestion I have made to increase the number of hours of undergraduate teaching of otolaryngology. It could be the answer to part of the problem with which we are confronted.

This suggestion is not made solely to have a bigger place in the sun. This would be senseless. It is made so that the medical needs of the country can be met in the best possible way. It is the only way at the present time that it can be done, as far as I can see. It will take a bit of doing. There will need to be some dedicated work on the part of many who are here. But it is a challenge worthy of the best that is in us.

TRANSACTIONS

American Academy of Ophthalmology and Otolaryngology

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THE SIXTY-FIFTH ANNUAL MEETING

"The most important factor in control of operating room and hospital infections is cleanliness." So asserted Ralph Adams, M.D., in the opening address on Epidemiology and Control of Hospital Infections at the Sixty-Fifth Annual Meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago. Staphylococcal infections have plagued surgeons and hospitals with unanticipated incidence and resistance to treatment in spite of vigilant precautions. The symposium was composed of speakers who were known to have studied the problem from the standpoint of the surgeon, internist, bacteriologist and hospital management for the opening, Joint Session of the scientific assembly. The problems are not new, nor is the answer, and only by continued vigilance and study by professional staff and administration can the incidence of these infections be kept to a minimum.

The 1960 meeting was another in a series of carefully planned programs of lectures, demonstrations and exhibits that have been acclaimed as the most valuable meetings on an international scale that physicians and surgeons in the specialties pertaining to the sensory organs have the good fortune to attend. The pattern established by holding the meetings in a central city, housed under one roof, where hotel facilities are adequate and the staff familiar with the requirements for orderly performance give an academic atmosphere that is in keeping with the objects of the Academy, instruction and education in the broadest sense. It's just like college week. Even the commercial exhibits are informative, and the exhibitors are instructors in their particular lines.

Attendance figures are indicative of the professional appeal of the Academy programs. The totals for this meeting, when analyzed, prove the value of diversified avenues for member participation, a truly democratic, voluntary, cooperative association of dedicated scientists and practitioners.

Registration figures are as follows: fellows, 2773; guests, 1110; candidates, 88; residents, 467; orthoptic technicians, 135; ladies, 1050; commercial exhibitors, 790; total, 6413.

Nearly all guests were physicians or scientists working in the field of sensory diseases, so it is safe to assume that 4400, or approximately 70 per cent, were in the medical field.*

President Lierle, in his inaugural address, related the history of the examining Boards and the Advisory Board for Medical Specialties. He defended the position of the Boards against recent criticisms published in lay magazines. "The specialty boards were created to help to correct a pre-existing inequality on the examination of a specialists' proficiency. The examinations are on a voluntary basis, and a specialist need not take the examination in order to practice his specialty. Some will say this is not true and that examinations are practically mandatory if one wishes to join a clinic, hospital staff or a special society. This is not necessarily the fault of the specialty boards. The responsibility here rests with the institutions and the societies requiring certification, for evidently they feel that the certified man is a better product." "Some institutions do not require certification for teachers, but do insist upon equivalent training. Some special societies,† in order to keep their autonomy, reserve the right to admit to their membership individuals who are not certified."

The Guest of Honor, Dr. Gordon D. Hoople, chose for his address the title "The Pursuit of Excellence." Always an idealist, a practical teacher and leader in educational circles, Dr. Hoople's comments on medical competence stressed high educational standards and continuous postgraduate study. "Medicine is a zealous goddess and she bestows her choicest favors only on those who match her pace." He then declared, "The plans for the general programs of the Academy, the scientific exhibits and the instructional hours are all aimed in this direction." "The growth of the Academy and the annual attendance are concrete evidence that such a program has an appeal and reaps rich rewards."

The Wherry Memorial Lecture, an annual item on the Otolaryngological Scientific Program, was to have been given by Dr. Anderson Hilding, but a confining illness prevented his attendance. His prepared address entitled "Experimental Studies on Some Little Understood Aspects of the Physiology of the Respiratory Tract and Their Clinical Importance" will be published in the TRANSACTIONS.

The Jackson Memorial Lecture, sponsored by the Ophthalmic Publishing Company, was given by Dr. Lorenz Zimmerman, the Academy Consultant on Pathology to the Armed Forces Institute of Pathology. Dr. Zimmerman prepared a comprehensive history of the Registries of Pathology in which he traced the initiating efforts of Dr. Harry S. Gradle in the establishment of the first of the registries at the Army Medical Museum. In looking forward to the wider use of the Registries, Dr. Zimmerman proposed the establishment of Registries of Living Pathology. This suggestion was presented to the Council by Dr. Edwin Dunphy, who moved that the Committees on Pathology consider the ways and means whereby such a service could best be established.

The scientific assemblies were replete with papers, motion pictures, and panel discussions covering a variety of subjects of intense interest.

The scientific exhibits were also of unusual excellence. The following awards were made on the recommendation of the judges:

*The new members elected this year included 232 Active, 2 Associates, and 2 Honorary Fellows. A check of Fellowship as of October 31, 1960, reveals that for the first time it has exceeded 7,000: Active, 5,868; Life, 1,019; Honorary, 29; Inactive, 141; Associates, 12; Total, 7,069.

†This includes the American Academy of Ophthalmology and Otolaryngology.

OPHTHALMOLOGY

First Award to the Department of Ophthalmology and Department of Orthopedic Surgery, College of Medicine, State University of Iowa, for the exhibit "Chamber Angle Anomalies in Developmental Glaucoma and in Systemic Mesodermal Disorders."

Second Award to Louis J. Girard, M.D., Charles D. Dukes, Ph.D., and Hilda H. Fox, Baylor University College of Medicine, Houston, Texas, for the exhibit "Interference Cinemicrography of Ocular Tissues."

Third Award to Walter Reed Army Hospital and National Institutes of Health, represented by Col. Austin Lowrey, Jr., MC, USA, and Capt. Richard B. Rich, MC, USA, Washington, D. C., and Murray C. Brown, M.D., and Willard C. Whitehouse, Bethesda, Maryland, for the exhibit "Color Television Photograph of the Fundus Oculi."

OTOLARYNGOLOGY

First Award to the Memphis Foundation of Otology, represented by John J. Shea, M.D., and David F. Austin, M.D., Memphis, Tennessee, for the exhibit "Surgical Treatment of Hearing Loss."

Second Award to the United States Army Medical Service, Fitzsimons General Hospital, represented by Wendell A. Weller, Col., MC, Denver, for the exhibit "Fibrosing Mastoiditis."

Third Award to Temple University School of Medicine and Hospital, represented by David Myers, M.D.; Woodrow D. Schlosser, M.D.; Arnold K. Brenman, M.D.; Lindsay L. Pratt, M.D., and Richard A. Winchester, Ph.D.. for the exhibit "Otologic Microsurgery: Otosclerosis Surgery and Tympanoplasty."

Special Scientific Programs outside the regular Academy Program were given under the auspices of affiliate organizations and Council Committees: Committee for Research in Otolaryngology — Northwestern University Medical School, Saturday, October 8, twelve papers dealing with research on the ear and its functions, the tracheo-pulmonary apparatus and the facial nerve. American Orthoptic Council and American Association of Orthoptic Technicians—Conrad Hilton Hotel, Sunday, October 9, A Symposium: The Nonsurgical Treatment of Strabismus. Committee on Conservation of Hearing—Grand Ballroom, Palmer House, Sunday, October 9, a series of papers on Hearing. The Committee on Reconstructive Plastic Surgery held two sessions on Tuesday evening: Ophthalmology — Grand Ballroom, Symposium — Exophthalmos; Otolaryngology—Crystal Room, two selected papers on plastic repair and one on General Principles of Lateral Osteotomy. Some of the papers read at the Special Programs will appear in the TRANSACTIONS.

The Council was requested by the Joint Committee on Eye Banks to form an Academy Committee on Eye Banks and appoint no representatives to the Joint Committee. It is the intention of the Council Committee on Eye Banks to establish standards for Eye Bank functions and to find means to stabilize their administration.

A Council Committee on Surgery of the Head and Neck was appointed with Dr. George A. Sisson as Chairman. This Committee had organized a society in 1959 composed of surgeons whose main interest would be surgery of the head and neck. The original Committee was dropped by the Council and the new organization regarded as an affiliate. However, this year they asked to be reinstated as an Academy Committee and the newly formed independent society was dissolved.

A change in classification of Fellows was authorized by the Council in 1959 by adopting changes in the By-Laws. The classification of Fellows as Junior and Senior was dropped, and all Active Fellows who had paid annual dues continuously for 25 years were made Life Fellows, exempt from further payment of dues. Approximately 400 were included in this change in January 1960. A number of applications for Active

Fellowship by distinguished foreign specialists were considered by the Council. On recommendation of the Board of Councillors the applications were rejected because of failure to fulfill the membership requirements. The Council, however, appointed a committee of four and the Executive Secretary-Treasurer as ex officio to study the advisability of setting up another classification, that of Corresponding Member. The Committee will report at the next meeting of the Council.

A change in the office of the Secretary for the Home Study Courses will bring about greater integration of all Academy activities. Dr. Daniel Snydacker after seven years of dedicated service has asked to be relieved, and with regret his request was granted. The appointment of Dr. Dean Lierle to the post of Secretary for the Home Study Courses follows the precedent of the first Secretary for that department, Dr. Harry S. Gradle, who had served as President of the Academy and was continued on the Council for many years. Assisting Doctor Lierle will be Dr. John W. Henderson of Ann Arbor, a member of the Orthoptic Council, and Dr. Peter Pastore, for a number of years Associate Secretary for Otolaryngology. Administratively it is now possible to integrate the Home Study Courses, the Teachers Section, the affiliate societies and the general program more fully than ever before.

Dr. Dohrmann Pischel, who will assume the office of President in January 1961, has called for an agenda for the annual January meeting of the Program Committee that will aim at a full scientific program with participation of all Council-authorized activities. Dr. Lawrence Boies, one of the former devoted Secretaries, was honored by the Academy by election to the office of President-Elect, which automatically places him in the office of President for 1962.

The Academy shows a healthy growth in membership and in activities in the field of education and instruction in the medical sciences and arts.

The 1961 Official Roster of the Academy will go to press on February 15, 1961. Please check your listing *now* and notify us promptly of any change of address. A form for this purpose will be found on the last page of this issue.

American Academy of Ophthalmology and Otolaryngology

Convention Attendance October 9-14, 1960

STATE	MEMBERSHIP AS OF 2-15-60	FELLOWS	GUESTS	RESIDENTS	CANDIDATES	ORTHOPTIC TECHNICIANS	TOTAL
Alabama	67	21	5	5	—	—	31
Alaska	3	3	3	—	1	—	7
Arizona	43	9	4	—	—	1	14
Arkansas	29	5	4	—	—	—	9
California	752	182	45	15	6	7	255
Colorado	93	36	17	4	1	3	61
Connecticut	112	37	11	2	1	—	51
Delaware	15	6	4	—	1	1	12
Dist. of Columbia	95	27	11	5	2	2	47
Florida	194	66	22	5	5	3	101
Georgia	84	36	15	2	—	8	61
Hawaii	20	6	1	—	—	—	7
Idaho	18	5	2	1	—	—	8
Illinois	387	306	244	118	9	10	687
Indiana	136	89	38	8	3	4	142
Iowa	86	50	17	20	1	2	90
Kansas	63	29	9	1	—	—	39
Kentucky	76	42	18	4	—	1	65
Louisiana	128	50	12	7	2	—	71
Maine	34	7	2	—	—	—	9
Maryland	89	41	24	14	1	4	84
Massachusetts	225	67	13	9	2	5	96
Michigan	237	141	78	40	3	16	278
Minnesota	145	72	10	7	—	2	91
Mississippi	25	15	4	1	1	1	22
Missouri	167	73	24	29	2	5	133
Montana	22	11	1	—	1	—	13
Nebraska	46	26	7	1	1	1	36
Nevada	12	1	—	—	1	—	2
New Hampshire	19	5	3	—	—	—	8
New Jersey	198	81	16	1	—	3	101
New Mexico	18	7	1	—	—	—	8
New York	949	291	81	47	3	18	440
North Carolina	86	25	14	8	1	—	48
North Dakota	19	12	1	—	1	1	15
Ohio	346	179	69	21	3	8	280
Oklahoma	48	17	3	—	2	1	23
Oregon	74	17	3	1	—	3	24
Pennsylvania	522	208	51	24	3	5	291
Rhode Island	26	11	3	1	—	—	15
South Carolina	50	15	6	—	1	—	22
South Dakota	12	8	1	—	—	—	9
Tennessee	98	50	8	8	1	1	68
Texas	293	112	31	16	8	6	173
Utah	39	11	2	—	1	—	14
Vermont	11	3	—	1	—	—	4
Virginia	104	32	12	10	3	1	58
Washington	98	34	10	—	3	1	48
West Virginia	48	19	6	—	1	—	26
Wisconsin	122	79	37	16	3	7	142
Wyoming	10	2	—	—	1	—	3
U. S. Territories	24	12	3	1	—	—	16
Canada	217	78	62	6	5	3	154
Foreign	59	7	54	3	2	3	69
TOTALS	6893	2774	1122	462	86	137	4581
Ladies							1050
Technical Exhibitors							790
GRAND TOTAL							6421

In Memoriam

Ralph A. Arnold.....Durham, North Carolina
July 17, 1960

Ione F. Beem.....Van Nuys, California
August 6, 1960

Stanley S. Burns.....St. Louis, Missouri
August 22, 1960

Julius James Chevigny.....Gary, Indiana
July 19, 1960

Anthony John Conty.....Union City, New Jersey
August 1, 1960

John James Crume.....Amarillo, Texas
August 9, 1960

Arthur Merl Culler.....Columbus, Ohio
October 26, 1960

Merle Jasper Davis.....Terre Haute, Indiana
October 28, 1960

William Hewson.....Philadelphia, Pennsylvania
October 29, 1960

Perley H. Kilbourne.....Dayton, Ohio
July 25, 1960

Jacob John Mann.....Perth Amboy, New Jersey
September 13, 1960

In Memoriam

George Martin McBean.....Chicago, Illinois
August 27, 1960

Carl Heber McCaskey.....Indianapolis, Indiana
October 8, 1960

Joseph Francis McGowan.....Asheville, North Carolina
July 17, 1960

George Henry Moore.....Upper Darby, Pennsylvania
October 1, 1953

Robert L. Moorhead.....Brooklyn, New York
August 2, 1960

Aaron Roth.....Brooklyn, New York
September 9, 1959

Edmund W. Rucker, Jr.....Birmingham, Alabama
August 7, 1960

Harry Theodore Schiefelbein.....Welch, West Virginia
August 17, 1960

James Jacob Simkins.....Philadelphia, Pennsylvania
July 2, 1960

Leigh F. Sturges.....Manhasset, New York
February 27, 1959

Clarence Archibald Veasey, Jr.....Spokane, Washington
August 22, 1960

Henry G. Wincor.....New York, New York
July 17, 1960

COUNCIL MINUTES

SIXTY-FIFTH ANNUAL SESSION

October 8 and 12, 1960
Palmer House, Chicago

Present:

Dean M. Lierle, Dohrmann K. Pischel, Harold G. Scheie, James H. Allen, Erling W. Hansen, LeRoy A. Schall, John H. Dunnington, William L. Benedict, Kenneth L. Roper, Clair M. Kos, A. D. Ruedemann, Eugene L. Derlacki, Daniel Snydacker, Glen G. Gibson, Victor A. Byrnes, Victor Goodhill, Edwin B. Dunphy, Harry P. Schenck.
Absent: David R. Higbee.

The meeting was called to order at 9:15 a.m. by Dr. Dean M. Lierle, President.

The Executive Secretary, Dr. William L. Benedict, gave the report of the Executive Secretary:

I

REPORT OF THE EXECUTIVE SECRETARY-TREASURER

1. Fellowship (as of January 1, 1960)

Active	5,804
Life	950
Honorary	29
Inactive	130
Associate	10
	6,923

2. Fellows Elected in 1959 (Included in total membership count as of January 1, 1960)

Associate Fellows: 2
Active Fellows: 266

[*The names of these new Fellows were published in the November-December* 1959 *issue of the* TRANSACTIONS.]

In 1959 the Senior Fellow Classification was eliminated. After January 1, 1960 all Fellows will elevate to Life Fellow after paying dues for 25 years.

3. Elevations to Life Fellowship on January 1, 1960 (456 Fellows):

Rudolf Aebli .....New York, N. Y.
Lucian W. Alexander .....New Orleans, La.
Samuel A. Alexander ....Washington, D. C.
Seeyman L. Alexander ....Toronto, Canada
Victor R. Alfaro .....Washington, D. C.
William B. Allan .....New York, N. Y.
Wm. Banks Anderson .....Durham, N. C.
David S. Arbuckle .....Akron, Ohio
David S. Asbill, Sr. .....Columbia, S. C.
Alvin G. Athens .....Duluth, Minn.
Edward A. Atwood .....Paterson, N. J.
Elroy J. Avery .....Rochester, N. Y.

Herschel E. Baldwin .....Danville, Ill.
Charles W. Barkhorn .....Newark, N. J.
Lancelot Barnes .....Toronto, Canada
Shirley Harold Baron ..San Francisco, Calif.
Edward J. Bassen .....New York, N. Y.
Oscar V. Batson .....Philadelphia, Pa.
William W. Baum .....Salem, Ore.
C. Wearne Beals .....DuBois, Pa.
Robert J. Beck .....Malone, N. Y.
William C. Behen .....Lansing, Mich.
John G. Bellows .....Chicago, Ill.
Henry A. Bender .....Waterloo, Iowa
M. S. Bender .....Jamaica, N. Y.
Milton B. Bergmann .....Babylon, N. Y.
Raynold N. Berke .....Hackensack, N. J.
Milton L. Berliner .....New York, N. Y.
Philip G. Berman .....Lowell, Mass.
Charles Berns .....Shaker Heights, Ohio
L. Kent Best .....Charleston, S. C.
Theodore E. Beyer .....Denver, Colo.
Edwin B. Bilchick .....New York, N. Y.
Robert J. Billings .....Pittsburgh, Pa.
Thorsten E. Blomberg .....Rockford, Ill.
Edwin J. Blonder .....Chicago, Ill.
Maxwell K. Bochner .....Toronto, Canada
Lilburn C. Boemer .....St. Louis, Mo.
Eugene G. Boss .....Springfield, Mass.
Delazon S. Bostwick .....Ardmore, Pa.
Jeter C. Bradley .....Weaverville, N. C.
C. Hugh Branigan .....Bronxville, N. Y.
J. L. Bressler .....Houston, Texas
Paul H. Breuning .....New York, N. Y.
Hyder Ford Brewster ....New Orleans, La.
Sacks Bricker .....Philadelphia, Pa.
Von Haller Brobeck .....Colorado Springs, Colo.
Morris J. Brooks .....Brooklyn, N. Y.
Clarence J. Brown .....Sacramento, Calif.
Birt L. Browning .....Miami Beach, Fla.
G. M. Bruce .....New York, N. Y.
John D. Brumbaugh .....Akron, Ohio

James F. Brusegard .....Red Wing, Minn.
Ben L. Bryant .....Los Angeles, Calif.
Walter M. Bucher .....Cleveland, Ohio
Tracy W. Buckingham ....Bismarck, N. D.
Lewis T. Buckman .....Wilkes-Barre, Pa.
Carleton W. Bullard .....Auburn, N. Y.
H. G. Bullwinkel .....Easton, Md.
Chester W. Bunnell .....Oakland, Calif.
Michael J. Buonaguro .....Brooklyn, N. Y.
B. Russell Burke .....Atlanta, Ga.
Herman J. Burman .....New York, N. Y.
Josiah F. Buzzard .....Altoona, Pa.

Frederick J. Cady .....Saginaw, Mich.
Norton Canfield .....New Haven, Conn.
Chapin Carpenter .....Philadelphia, Pa.
Earl D. Carter .....Wichita, Kan.
Waldron A. Cassidy .....Omaha, Neb.
Virgil Casten .....Boston, Mass.
Ramon Castroviejo .....New York, N. Y.
Edward L. Chainski .....Chicago, Ill.
Cecil P. Clark .....Indianapolis, Ind.
William B. Clark .....New Orleans, La.
Samuel Cline .....Boston, Mass.
Don A. Cohoe .....Detroit, Mich.
Nathanial B. Cole .....Perth Amboy, N. J.
John E. Conboy .....New York, N. Y.
John M. Conway .....Plant City, Fla.
W. S. Conway .....Petoskey, Mich.
A. J. Coombs .....Chicago, Ill.
Eugene H. Coon ....Hempstead, L. I., N. Y.
Frederick C. Cordes ....San Francisco, Calif.
Andre J. Cortopassi .....Saginaw, Mich.
Harold W. Corya .....Quogue, L. I., N. Y.
Arthur J. Cracovaner .....New York, N. Y.
Francis M. Crage .....Sarasota, Fla.
Paul C. Craig .....Reading, Pa.
William J. Cress .....Pottsville, Pa.
Charles A. Croissant .....Worcester, Mass.
James E. Croushore .....Detroit, Mich.
Arthur M. Culler .....Columbus, Ohio
George O. Cummings .....Portland, Maine
Rodolph M. Cutino .....Brooklyn, N. Y.

Elmer O. Dahl .....Minneapolis, Minn.
Ralph W. Danielson .....Denver, Colo.
L. E. Darrough .....Dallas, Texas
Harry F. Davies .....Washington, D. C.
Kenneth M. Day .....Pittsburgh, Pa.
Robert M. Dearmin .....Indianapolis, Ind.
James H. Delaney .....Erie, Pa.
Ward C. Denison .....Ridgewood, N. J.
Charles W. Depping .....New York, N. Y.
J. Charles Dickson .....Houston, Texas
Frank W. Dimmitt .....Providence, R. I.
Waldo B. Dimond .....Madison, Wis.
Otto R. Dobbs .....Walnut Creek, Calif.
Warren M. Dodge, Jr. ..Battle Creek, Mich.
Clifford L. Dougherty .....Chicago, Ill.
Julian N. Dow .....Beverly Hills, Calif.
Harvey E. Dowling ..Calgary, Alta., Canada
Frederick J. Driscoll ..Fort Lauderdale, Fla.
R. Renfro Duke .....Tampa, Fla.
Carl E. Dunaway .....Miami, Fla.
Edwin B. Dunphy .....Boston, Mass.

Stephen A. Edwards .....Van Wert, Ohio
Murdock S. Equen .....Atlanta, Ga.
Maurice G. Evans .....Boston, Mass.
William H. Evans .....Youngstown, Ohio

C. L. Fackler .....York, Pa.
Samuel Z. Faier .....Fort Smith, Ark.
James I. Farrell .....Utica, N. Y.
M. Fording Fellows .....Duluth, Minn.
Ralph G. Ferris .....Birmingham, Mich.
Alexander G. Fewell .....Philadelphia, Pa.
Abraham Fine .....Brooklyn, N. Y.
Victor W. Fischbach .....Cincinnati, Ohio
Louis Z. Fishman .....Walnut Creek, Calif.
F. J. C. Fitzgerald .....Evanston, Ill.
Juan H. Font .....San Juan, Puerto Rico
Harold Foster ..Jackson Heights, L. I., N. Y.
Warren H. Foster .....Clinton, Iowa
Wayne J. Foster .....Cedar Rapids, Iowa
F. Bruce Fralick .....Ann Arbor, Mich.
W. Guernsey Frey, Jr. ....New York, N. Y.
Benjamin Friedman .....New York, N. Y.
Wilfred E. Fry .....Philadelphia, Pa.
Thomas F. Furlong, Jr. .....Ardmore, Pa.

Carson King Gabriel .....Quincy, Ill.
Ernest W. Garrett .....Cleveland, Ohio
John D. Garrett .....Indianapolis, Ind.
Honore E. Gaudreau .....Springfield, Mass.
J. Conrad Gemeroy .....Detroit, Mich.
Manfred Gerstley .....Chestertown, Md.
William F. Gessler .....Fairhope, Ala.
Glen Gregory Gibson .....Philadelphia, Pa.
Oliver S. Gilliland .....Kansas City, Mo.
Arthur C. Glover .....Elmira, N. Y.
Robley R. Goad .....Muscatine, Iowa
Michael Goldenburg .....Chicago, Ill.
John B. Gooch .....New Orleans, La.
Harry B. Goodspeed .....Worcester, Mass.
William Gordon .....Philadelphia, Pa.
Joseph I. Gouterman .....Philadelphia, Pa.
Charles Clyde Grace .....St. Augustine, Fla.
Carl Granberry .....New Orleans, La.
Hendrie W. Grant .....St. Paul, Minn.
Hyman S. Green .....Chicago, Ill.
Maurice L. Greene .....McAllen, Texas
Glenn J. Greenwood ....Los Angeles, Calif.
George P. Guibor .....Chicago, Ill.
Trygve Gundersen .....Boston, Mass.

Van Dyke Hagaman .....Jackson, Miss.
William H. Hahn .....Newark, N. J.
Paul G. Haire .....Boston, Mass.
Sobisca S. Hall .....Clarksburg, W. Va.
Alton V. Hallum .....Atlanta, Ga.
Arthur E. Hammond .....Detroit, Mich.

Frank Hand .....San Francisco, Calif.
H. James Hara .....Los Angeles, Calif.
George C. Hardie .....Jackson, Mich.
Edward W. Harris .....Columbus, Ohio
J. Harley Harris .....Memphis, Tenn.
Eugene C. Hartman ....Parkersburg, W. Va.
Dewey R. Heetderks ...Grand Rapids, Mich.
Charles J. Heinberg .....Pensacola, Fla.
Lawrence E. Henderson ..Watertown, N. Y.
Louis J. Hendricks .....Norwood, Ohio
William Hewson .....Philadelphia, Pa.
William Joseph Hicks ....Middletown, N. Y.
Isaac B. High .....Reading, Pa.
A. C. Hilding .....Duluth, Minn.
H. Rommel Hildreth .....Clayton, Mo.
Henry L. Hilgartner, Jr. .....Austin, Texas
Otto C. Hirst .....Philadelphia, Pa.
John B. Hitz .....Milwaukee, Wis.
John J. Hochfilzer .....St. Paul, Minn.
William A. Hoffman .....Chicago, Ill.
Abraham R. Hollender ....Miami Beach, Fla.
Joseph Minor Holloway .Fredericksburg, Va.
William F. Holzer .....Worcester, Mass.
Walter B. Hoover .....Boynton Beach, Fla.
Guy H. Hopkins .....Pueblo, Colo.
George A. Hornback .....Hannibal, Mo.
Walter T. Hotchkiss .....Miami Beach, Fla.
Robert E. Howard .....Cincinnati, Ohio
Donald M. Howell .....Saginaw, Mich.
William B. Hubbard .....Flint, Mich.
Walter A. Huber .....Tulsa, Okla.
Allen Hull .....Brooklyn, N. Y.
William T. Hunt, Jr. .....Wynnewood, Pa.
James F. Hunter .....Cairo, Ill.
Robert J. Hunter .....Philadelphia, Pa.

Chevalier L. Jackson .....Philadelphia, Pa.
Milton Jacobs .....Chicago, Ill.
William M. James .....St. Louis, Mo.
Charles W. Jennings .....Pittsburgh, Pa.
Henrietta M. Johnson .....Pasadena, Calif.
Henry P. Johnson .....Portland, Mass.
Kenneth B. Johnston .Montreal, Que., Canada
David H. Jones .....New York, N. Y.
Delbert K. Judd .....Kankakee, Ill.
J. H. Judd .....Omaha, Neb.

Samuel Kaplan .....Beverly Hills, Calif.
Carl G. Kapp .....Elizabeth, N. J.
Varaztad H. Kazanjian .....Boston, Mass.
Lansing H. Keeler .....Jamaica, N. Y.
George F. Keiper .....Visalia, Calif.
Vincent J. Kelley .....Boston, Mass.
George F. J. Kelly .....Merion, Pa.
Lee Kend .....Flushing, L. I., N. Y.
John E. L. Keyes .....Cleveland, Ohio
J. A. Keyton .....Dothan, Ala.
Charles E. Kinney .....Cleveland, Ohio
James C. Kirkbright .....New York, N. Y.
Oram R. Kline .....Camden, N. J.
Arthur Alexander Knapp ..New York, N. Y.
William J. Knauer .....Jacksonville, Fla.
John S. Knight .....Kansas City, Mo.
Willis S. Knighton .....New York, N. Y.
Louis K. Koller .....Minneapolis, Minn.
Julius C. Kramer .....Sandusky, Ohio
Emanuel Krimsky .....Brooklyn, N. Y.
Peter C. Kronfeld .....Chicago, Ill.
Hedwig Kuhn .....Hammond, Ind.
Max M. Kulvin .....Miami, Fla.

Herman I. Laff .....Denver, Colo.
Robert G. Laird .....Grand Rapids, Mich.
Max T. Lampert .....Minot, N. D.
James E. Landis .....Reading, Pa.
George H. Lang .....Savannah, Ga.
G. Arthur Larson .....Fargo, N. D.
Joseph Laval .....New York, N. Y.
Lawrence J. Lawson .....Evanston, Ill.
Vernon M. Leech .....Chicago, Ill.
Albert E. Leggett .....Louisville, Ky.
Samuel L. Lemel .....Cleveland, Ohio
Norman Leshin .....Chicago, Ill.
Jesse M. Levitt .....Brooklyn, N. Y.
Abram Levy .....Bound Brook, N. J.
Harry H. Levy .....Binghamton, N. Y.
Byron Newton Lingeman ....Crawfordsville, Ind.
J. Jerome Littell .....Santa Rosa, Calif.
Charles Littwin .....Palisade, N. J.
George S. Livingston .....Chicago, Ill.
Walter R. Loewe .....New York, N. Y.
Lyle J. Logue .....Houston, Texas
Gerson Lowenthal .....Cincinnati, Ohio
John A. Lukens .....Toledo, Ohio
Romeo A. Luongo .....Norristown, Pa.
Carl W. Lupo .....St. Simons Island, Ga.
Moses H. Lurie .....Boston, Mass.

Paul B. MacCready .....New Haven, Conn.
Joseph C. Macdonald ..Oklahoma City, Okla.
Philip G. MacDonald .....New York, N. Y.
Angus L. MacLean .....Baltimore, Md.
John P. Macnie .....Los Gatos, Calif.
Frank B. Malone .....Lubbock, Texas
Jacob J. Mann .....Perth Amboy, N. J.
Raymond H. Marcotte .....Nashua, N. H.
Wilson C. Marsden .....Wilkes-Barre, Pa.
W. O. Martin, Jr. .....Atlanta, Ga.
Abraham P. Matusow ....New York, N. Y.
Harvey C. Maxwell .....Santa Ana, Calif.
James H. Maxwell .....Ann Arbor, Mich.
William R. McAdams .....Portland, Maine
Andrew W. McAlester, III ....Liberty, Mo.
Leo F. McAndrews .....Bryn Mawr, Pa.
G. W. McAuliffe .....New York, N. Y.
Thomas B. McCollough ....Pittsburgh, Pa.
Thomas F. McCormick ....Milwaukee, Wis.
J. Calhoun McDougall .....Atlanta, Ga.
Oliver B. McGillicuddy .....Lansing, Mich.
L. Chester McHenry ..Oklahoma City, Okla.

Thomas G. McLellan .....Connellsville, Pa.
Raymond E. Meek .....Stephentown, N. Y.
William C. Meloy .....Washington, D. C.
Philip E. Meltzer .....Boston, Mass.
F. W. Merica .....Lakewood, Ohio
Maurice E. Mesirow ..San Francisco, Calif.
G. Leslie Miller .....Lakewood, Ohio
Joseph A. Miller .....South Orange, N. J.
M. Valentine Miller .....Philadelphia, Pa.
Saul Miller .....Jamaica, N. Y.
Theodore E. Miller .....Pasadena, Calif.
Walter Moehle .....Brooklyn, N. Y.
Arthur M. Moll .....Grand Rapids, Mich.
James J. Monahan .....Shenandoah, Pa.
Paul M. Moore, Jr. .....Cleveland, Ohio
Robert L. Moorhead .....Brooklyn, N. Y.
Roy V. Morledge .....Billings, Mont.
Lafayette P. Monson ..San Francisco, Calif.
Clifford J. Mullen .....Kansas City, Kan.
Claude S. Mumma .....Los Angeles, Calif.
Albert B. Murphy .....Everett, Wash.
William E. Murphy .....Worcester, Mass.
Henry J. Murray .....Stamford, Conn.
Irving Muskat .....Milwaukee, Wis.

Walter Irving Neller ....Middletown, N. Y.
Glenway W. Nethercut .....Chicago, Ill.
William A. Newlands ....Tarrytown, N. Y.
Morris H. Newton .....Little Falls, N. Y.
Leonard Nippe .....Toledo, Ohio
Oscar B. Nugent .....Chicago, Ill.

Gerald R. O'Brien .....Brooklyn, N. Y.
Stanley G. Odom .....Covington, Ky.
Chester L. Oppegaard .....Crookston, Minn.
Carroll O'Rourke .....Fort Wayne, Ind.
Grover Cleveland Otrich .....Belleville, Ill.

Errett Pace .....Paducah, Ky.
Harry L. Parker .....Lockport, N. Y.
Thayer L. Parry .....Akron, Ohio
Louis A. Parsell .....Spokane, Wash.
William C. Paul .....Santa Ana, Calif.
Brittain F. Payne .....New York, N. Y.
Virgil L. Payne .....Pine Bluff, Ark.
Lyndon A. Peer .....East Orange, N. J.
Claude S. Perry .....Columbus, Ohio
Abram H. Persky .....Philadelphia, Pa.
Raymond L. Pfeiffer .....New York, N. Y.
Josephine Dirion Phillips ....Cleveland, Ohio
Ralph H. Pino .....Plymouth, Mich.
Rolland C. Pochert .....Owosso, Mich.
Ernest C. Pope .....Birmingham, Ala.
Whitney C. Porter .....Denver, Colo.
Jacob J. Potter .....Rockford, Ill.
Willis A. Potter .....Detroit, Mich.
Joel J. Pressman .....Los Angeles, Calif.
Henry Grant Preston ....Harrisonburg, Va.

Frank L. Ralston .....Walla Walla, Wash.
Victor Ray, Jr. .....Cincinnati, Ohio
Charles L. Reed .....Pittsburgh, Pa.
James J. Regan .....South Boston, Mass.
Horace W. Reid .....Cincinnati, Ohio
Malcolm M. Riddell .....Fremont, Ohio
James P. Rigg .....Grand Junction, Colo.
Edward L. Rigley .....South Bend, Ind.
Aaron D. Riker .....Pontiac, Mich.
Meyer H. Riwchun .....Buffalo, N. Y.
James T. Robison .....Austin, Texas
Benjamin Rones .....Washington, D. C.
D. Hamilton Row .....Indianapolis, Ind.
A. Harry Rubenstein .....Syracuse, N. Y.
Roland D. Russell .....Elgin, Ill.

Benjamin Sachs .....West Roxbury, Mass.
David Sackin .....New York, N. Y.
Sam H. Sanders .....Memphis, Tenn.
William Y. Sayad ...West Palm Beach, Fla.
Herman D. Scarney .....Detroit, Mich.
Solomon P. Schechter ....New York, N. Y.
Henry M. Scheer .....New York, N. Y.
Harry T. Schiefelbein .....Welch, W. Va.
Raphael Schillinger .....Westfield, N. J.
Elmer P. Schluer .....St. Louis, Mo.
Herbert G. Schmidt .....Milwaukee, Wis.
Nathan Schneck .....Tucson, Ariz.
Clarence K. Schubert .....Madison, Wis.
Leo Schwartz .....New York, N. Y.
S. A. Sciarretta .....Chicago, Ill.
Harry Secoy .....Everett, Wash.
Samuel Segal, Jr. .....Springfield, Mass.
Samuel Selinger .....Hackettstown, N. J.
Samuel Seltz .....Cincinnati, Ohio
Herman Semenov .....Beverly Hills, Calif.
Jackson A. Seward .....New York, N. Y.
Clarence W. Shannon .....Seattle, Wash.
Theodore M. Shapira .....Chicago, Ill.
Sherman L. Shapiro .....Chicago, Ill.
A. Russell Sherman .....Newark, N. J.
J. L. Shipley .....Elizabeth City, N. C.
James S. Shipman .....Camden, N. J.
Edward Pierce L. Shope .....Camden, N. J.
Emanuel Simon .....Albany, N. Y.
Neal S. Simons .....Whitehall, Wis.
G. Victor Simpson .....Washington, D. C.
Walter K. Slack .....Saginaw, Mich.
Henry O. Sloane .....Philadelphia, Pa.
John L. Sly .....Summit, N. J.
William L. Smith .....Salt Lake City, Utah
Windsor R. Smith .....Binghamton, N. Y.
George C. Snell .....Toronto, Ont., Canada
P. W. Snelling .....Hartford, Conn.
Gail R. Soper .....Evanston, Ill.
Herman Sparber .....Brooklyn, N. Y.
Court R. Stanley .....Minneapolis, Minn.
William W. Stevenson .....Flint, Mich.
Leslie O. Stone .....Rocky Mount, N. C.
David D. Stonecypher, Sr. ...Nebraska City, Neb.
Clarence R. Straatsma ....New York, N. Y.
August J. Streit .....Amarillo, Texas

Joseph Albert Sullivan, Toronto, Ont., Canada
Robert E. Sullivan .....Nashville, Tenn.
Cecil C. Swann .....Asheville, N. C.

E. Merle Taylor .....Portland, Ore.
Joseph W. Taylor .....Tampa, Fla.
Walter H. Theobald .....Chicago, Ill.
W. Maxwell Thomas .....Dallas, Texas
Harvey E. Thorpe .....Pittsburgh, Pa.
Phillips Thygeson .....San Jose, Calif.
R. S. Tillotson .....Sacramento, Calif.
John M. Tindal .....Chicago, Ill.
Thomas L. Tolan .....Milwaukee, Wis.
Joseph F. Toot .....Canton, Ohio
C. Dwight Townes .....Louisville, Ky.
Charles E. Towson .....Philadelphia, Pa.
G. Edward Tremble ..Montreal, Que., Canada
William H. Turnley .....Ocala, Fla.
Ervin A. Tusak .....New York, N. Y.

Derrick T. Vail .....Chicago, Ill.
Frank H. Valone .....Rome, N. Y.
O. E. Van Alyea .....Chicago, Ill.
William E. Vandevere .....El Paso, Texas
Earle W. Voorhees ....Poughkeepsie, N. Y.
Elmer A. Vorisek .....Des Moines, Iowa

Alfred Wachsberger .....Sacramento, Calif.
Edward A. Waldeck .....Milwaukee, Wis.
E. Garland Walls .....New Orleans, La.
Harold R. Watkins .....Bloomington, Ill.
Homer V. Weaver .....Canton, Ohio
Franklin R. Webster .....Syracuse, N. Y.
Charles R. Weeth .....Brooklyn, N. Y.
Jack Allan Weiss .....Chicago, Ill.
William A. Weldon .....Glasgow, Ky.
Waldemar T. Wenner .....St. Cloud, Minn.
Virgil Westcot .....Chicago, Ill.
Herbert Olander Westervelt .Benton Harbor, Mich.
John O. Wetzel .....Fort Lauderdale, Fla.
David Wexler .....New York, N. Y.
Maynard C. Wheeler .....New York, N. Y.
William F. Whelan .....Philadelphia, Pa.
Elmer L. Whitney .....Detroit, Mich.
LeRoy E. Wible .....San Diego, Calif.
William W. Wilkerson, Jr. ..Nashville, Tenn.
Samuel Henry Wilkins .....Boston, Mass.
A. P. Wilkinson .....Detroit, Mich.
Richard W. Wilkinson ....Washington, D. C.
Robert G. Wilson .....Batavia, N. Y.
Henry G. Wincor .....New York, N. Y.
Herman A. Winkler .....Providence, R. I.
Charles C. Wolcott .....Bronxville, N. Y.
David R. Womack .....Austin, Texas
E. Christopher Wood ..Myrtle Beach, S. C.
DeGraff Woodman .....New York, N. Y.
George Henry Woodruff .....Joliet, Ill.
W. Burbank Woodson .....Temple, Texas

Clarence M. Young .....Portland, Ore.

4. Voted Inactive Fellow (11 in 1959)

James P. Aderhold .....San Antonio, Texas
Robert S. Bolin .....Elkhart, Ind.
Frederic E. Cressman ....Hollywood, Calif.
Oscar Davis .....Lancaster, Pa.
Illona Krasso de Suto-Nagy ....New Haven, Conn.
Thomas Reed Gagion .....Pittston, Pa.
Colby Hall .....Los Angeles, Calif.
Sister Lucia
(Hallie Hartgraves) .....Kenosha, Wis.
Thomas Holt .....Warrenton, N. C.
Elmer W. O'Brien .....Webster, N. Y.
Jacob Ruchman .....Brooklyn, N. Y.

5. Deaths from January 1, 1959 to December 31, 1959 (77 Fellows)

George Carter Albright ....Iowa City, Iowa
William W. Alderdyce .....Toledo, Ohio
Moacyr E. Alvaro .....Sao Paulo, Brazil
Donald Taylor Atkinson, San Antonio, Texas

Carl C. Beisbarth .....St. Louis, Mo.
Roy Spitler Binkley .....Dayton, Ohio
August J. Blickenstaff .....Peoria, Ill.
Leo B. Bouvy .....LaGrande, Ore.
Robert James Bowman ..Beverly Hills, Calif.
Kenneth Charles Brandenburg ..Long Beach, Calif.
Everett Hayden Brooks .....Appleton, Wis.
Wilbur Max Brown .....Mansfield, Ohio
Howard Hampden Burnham .....Toronto, Canada
Louis Bernard Bushman .....Omaha, Neb.

William James Creighton ..Philadelphia, Pa.
Marvin McTyeire Cullom ..Nashville, Tenn.

Ralph Allison Davis .....Chicago, Ill.

Norma B. Elles .....Kalamazoo, Mich.
Joseph Norman Elliott ....Bloomington, Ill.
Thomas Holmes Emmens ....Medford, Ore.
Merton A. Farnsworth .....LaJunta, Colo.

Ralph Bryan Fast .....Kalamazoo, Mich.
Roger Richard Flickinger ..Mason City, Iowa
Ulrich Alfred Fritschi ....Sacramento, Calif.

Watson W. Gailey .....Bloomington, Ill.
Harold James Gibby .....Worcester, Mass.
Harold Moore Griffith .....Johnstown, Pa.
Jacob Franklin Gsell .....Wichita, Kan.

John Parkinson Harbert ..Bellefontaine, Ohio
William Howard Heine .....Fremont, Neb.
Bert Eugene Hempstead ....Rochester, Minn.
Llewellyn Evans Hetrick ..Hampton, Conn.
Clifton Earl High .....Pampa, Texas
Armenious Clements Hobbs, Jr. ..Columbus, Ga.

George Esplin Hodge ....Westmount, Canada
Virgil Eugene Holcombe .Charleston, W. Va.
John Gill Holland .....Lynchburg, Va.
Kendall Hooper .....Flint, Mich.

George Thomas Jordan ....Vermillion, S. D.

Theodore Simon Kammerling .Melrose Park, Ill.
Francis Lawrence Kennedy ..St. Louis, Mo.

Edward Francis Lawlor ....Waltham, Mass.
Robert Farris Loughmiller ..Oklahoma City, Okla.

Andrew Louis MacMillan, Jr., Concord, N. H.
John William Mayher .....Columbus, Ga.
Oscar Milton Marchman .....Dallas, Texas
Archibald Duncan McCannel ..Minot, N. D.
James Homer McCready ....Pittsburgh, Pa.
Bertha Schenck S. McDavitt ....Fort Worth, Texas
Claude H. Miears .....Austin, Texas
Isidore Miller .....New York, N. Y.
Alexander L. Moshinsky ..New York, N. Y.
John Llewellyn Myers ..Des Moines, Wash.

Lawrence James Nacey ....Rochester, N. Y.
Professor Dr. F. Nager ..Zurich, Switzerland
Carl A. Noe .....Cedar Rapids, Iowa

Dwight Chapman Orcutt .....Evanston, Ill.

Norman Vern Peterson ....Avon Park, Fla.
George Henri Poirier .....Boston, Mass.

William Wallace Reed .....Topeka, Kan.
Paul William Renken ....New Orleans, La.
James Joseph Richardson .....Fort Worth, Texas
Philip L. Romonek ....Beverly Hills, Calif.
Michael Rosenbluth .....New York, N. Y.

Bernard Samuels .....New York, N. Y.
Elbert Stetson Sherman ....Newark, N. J.
Harold Simons .....San Francisco, Calif.
Samuel Harry Skloff .....Philadelphia, Pa.
James Butt Stanford .....Memphis, Tenn.

Ernest E. Tippin .....Wichita, Kan.
Manuel Uribe Troncoso ..New York, N. Y.
Oliver W. Turner ....Elmhurst, L. I., N. Y.

Charles Edward Walker ..Colorado Springs, Colo.
John Joseph Walsh .....Chicago, Ill.
Henry Charles Weber .....Drexel Hill, Pa.
Robert S. G. Welch .....Annapolis, Md.
George Adrian Wiley .....Norman, Okla.

6. Delinquent—Voted Dropped from Membership (4 in 1959)

7. At the direction of the Council in 1959 the President appointed Phillips Thygeson as Academy representative to the International Organization Against Trachoma, which meets in New Delhi, India, December 3-7, 1962.

8. The following Interim appointments were made by the President:

Walter Benedict was appointed Academy representative to the A.M.A. ad hoc Committee on Atomic Medicine and Ionizing Radiation.

An Advisory Committee consisting of Kenneth L. Roper, Chairman, Daniel Snydacker, Albert M. Potts, Joseph R. Fitzgerald and Paul Sternberg was appointed to the Audio-Visual Committee of the Museum of Science and Industry of Chicago.

John H. Dunnington was appointed Academy representative to the Pan-European Ophthalmological Society which met in Athens, Greece, April, 1960.

9. The Council in 1959 appropriated funds for a Fellowship in Ocular Pathology at the Armed Forces Institute of Pathology in the amount of $600.00 a month for a 12-month period. Milton Boniuk terminated his Fellowship at the AFIP on June 30, 1960. Gloria Lim will begin her Fellowship at the AFIP November 1, 1960. There were no applications received for a Fellowship in Otolaryngic Pathology.

The Academy continues to support Lorenz Zimmerman as an Academy consultant in Pathology at the AFIP at a stipend of $7,000 yearly.

10. The Educational Trust Fund authorized by the Council in October 1959 was activated on August 5, 1960. The Securities in the Custodial Account of the First National Bank of Minneapolis were transferred to the Educational Trust Fund in the Trust Department of the First National Bank of Minneapolis. The Disbursement Committee has adopted the following rules for disbursement of funds:

1. All dividends, interest and other income from the securities held in trust for the Educational Fund shall be added to the Fund as they are received.

2. Disbursements from the Educational Fund shall not exceed the income from securities held in the Trust.

3. Disbursement of the income from the Educational Fund shall be limited to purposes set forth in the Trust Agreement.

4. Additional funds may be given to the Educational Fund from the current account

from the Secretary-Treasurer of the Academy upon his recommendation and with the approval of the Disbursement Committee.

5. The top limit of Fellowship should not exceed $7,500, except in special circumstances recommended by the Disbursement Committee, and with the approval of the Council.

Question 1—Do you favor a change of date for the annual meeting of the Academy?

	NO	YES
Ophthalmologists	1768	833
Otolaryngologists	846	530
OALR-LB-PLS-L-LR	590	292
Totals	3204	1655

If so, what month?

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
OP	65	72	83	81	65	81	30	23	66		95	102
ALR	31	32	41	20	29	35	20	36	148		51	29
OALR, etc.	19	18	15	20	14	31	13	12	60		37	21
Totals	115	122	139	121	108	147	63	71	274		183	152

6. The Disbursement Committee should meet at least twice yearly at Academy expense.

7. The Trustee will send quarterly reports to the Secretary-Treasurer of the Academy.

Dr. Benedict asked for a voice vote of approval of these rules for disbursement of funds.

DR. HANSEN: *We understand these guidelines now, but if Item 2 is not a rigid rule that we spend only the income from this fund, some exception should be made in the rule so that future members of the committee may understand.*

DR. BENEDICT: *The exception is "under circumstances that may be spelled out in the Trust Agreement." The Trust Agreement allows for other expenditures on occasions of emergency and by vote of the Council. I suggest that it be left for the next meeting of the Disbursement Committee to resolve this problem.*

Dr. Roper moved that the Council approve the rules for disbursement of funds, with the above reservation. The motion was seconded by Dr. Dunnington, and carried.

11. The Council directed the President to appoint a committee to meet with the Board of Regents of the American College of Surgeons regarding the time and place of the annual meetings. The President appointed Edwin B. Dunphy, Victor Goodhill, David Higbee and W. L. Benedict. The Committee made a mail survey of the membership of the Academy on this matter. The results of the survey were published in the March-April 1960 issue of the TRANSACTIONS as follows:

From this tally, there is no trend toward a seasonal shift, but with the fewer votes for July and August and the somewhat great vote for September, November and December, it indicates a majority choice for a fall meeting, with October a distinct favorite when viewed in the light of the two to one vote in favor of no change.

Question 2—Do you favor holding the meeting in a city other than Chicago?

	NO	YES
Ophthalmologists	1307	1284
Otolaryngologists	756	637
OALR-LB-PLS-L-LR	502	377
Totals	2565	2298

If so, where?

A number of cities were mentioned in which adequate facilities are not available for the type of program the Academy has planned over the past twenty years. Most of the returns that mentioned cities other than Chicago suggested rotating meetings through East and West Coast cities and back to Chicago once in three or four years. The reason given for rotating, "I would like to see some other places." No place other than Chicago was suggested as superior in facilities, accessibility, convenience and logistics for the usual type of Academy convention.

Question 3—Is your practice chiefly ALR-OP-OALR-L-LB-LR-PLS?

The response to this question served as the basis for the division into specialties in the tallies for Questions 1, 2 and 4.

Question 4—Would you seriously plan to attend the annual meeting of the American College of Surgeons if it did not conflict with the annual meeting of the Academy?

	NO	YES
Ophthalmologists	1821	797
Otolaryngologists	871	526
OALR-LB-PLS-L-LR	553	320
Totals	3245	1643

Most reports marked YES carried other comments, such as "If they had a good program." The replies to this last question are very significant to the Committee. Where a choice must be made between the meetings of the Academy and of the American College of Surgeons, the great majority favored the meetings of the Academy.

As a result of the mail ballot it was noted that an overwhelming percentage of the Fellows of the Academy preferred Chicago in October as the time and place of the annual meeting. When the time and place of future meetings of the American College of Surgeons were ascertained, the Secretary secured the following tentative dates for annual meetings of the Academy to be held at the Palmer House in Chicago.

1961—October 8-13
1962—October 21-26
1963—October 20-25
1964—October 18-23

None of these dates conflict with meetings of the American College of Surgeons. Due to the wide geographic situations of the Committee members a suitable date for a meeting was not negotiated, consequently the Committee has not met with representatives of the American College of Surgeons. There has been no correspondence with the American College of Surgeons on this matter.

DR. LIERLE: *We must leave it to the Secretary-Treasurer and the Program Committee to use their discretion and make dates as advantageous to both societies as possible.*

12. The Academy is Principal Investigator for three grants from the NINDB.

The Use of Diagnostic Procedures and Therapy in Uveitis project is now in its third year and has been approved for another year. A booklet of instructions for conducting a series of skin tests for sensitivity to a number of specially prepared antigens and for tests of serum for brucellosis, toxoplasmosis and leptospirosis have been distributed to ophthalmologists and pathologists in this country and some foreign countries. Kits of antigens are supplied through Hollister-Stier Laboratories of Spokane. The serology now is being done by the South Bend (Indiana) Medical Foundation. The contract with the CDC Laboratory in Chamblee, Ga., was terminated July 31, 1960. The Academy Uveitis Committee has not functioned during the past year and I recommend that it be terminated and the members thanked for their past performances.

DR. RUEDEMANN: *I second the recommendation to disband the Committee. The motion carried.*

DR. BENEDICT: *This recommendation of the Council will be referred to the Executive, Research and Finance Committee.*

13. The Subcommittee on Hearing in Children of the Committee on the Conservation of Hearing conducts an extensive research in the public schools of Pittsburgh and Baltimore in conjunction with the University of Pittsburgh, Johns Hopkins University and the Children's Bureau. The grant from the NINDB has been continued for another year and an application will soon be submitted for a supplemental fund or a new grant, if the NINDB so rules, for a marked extension of the research project.

14. An Employment Registry of Scientists in the basic sciences appertaining to ophthalmology and otolaryngology has been established by the Academy under a grant from the NINDB. The Registry will aid in the placement of candidates completing training who desire academic and investigative positions, and in the replacement of those already in such positions. The grant has been continued for another year.

15. The Committee on the Conservation of Hearing delegated John R. Lindsay and Harold Schuknecht to write a descriptive article on the technique of temporal bone removal during a post-mortem. The prepared article was published in the TRANSACTIONS, September-October, 1959, and reprints sent to otologists, pathologists and coroners. A second reprinting has recently been made necessary by a number of requests for it. Two motion picture films on the subject are available on loan from the Academy.

16. John R. Lindsay who is a member of the Subcommittee on Research of the Committee on the Conservation of Hearing has

sent to the Academy office legal forms for the contribution of Temporal Bones to a Bank for Ear Research. The Academy is sending out these forms to individuals on request. The completed application forms are kept on file in the Academy office and when temporal bones become available and word comes that they are to be shipped, the Academy will send them to a laboratory that is in a position to receive and process them. The members of the Subcommittee will review the method of handling the bones at their next meeting and see to it that the list of laboratories prepared to process the bones is kept up to date. The Temporal Bone Bank Program is supported in part by the Deafness Research Foundation.

The Deafness Research Foundation has announced a $10,000 grant in support of the first nation-wide program of temporal bone banks. A major part of this program will be an appeal to persons with a medical record of impaired hearing for the donation of their inner ear structures upon death. Director of this project is John R. Lindsay.

17. The teaching aids produced by the Academy including manuals, motion pictures, filmstrips, albums, atlases and abstracts are filling a need that judging from the current orders, is growing rapidly. Twenty-four manuals and monographs are now available. Six more are under preparation and will be available in 1961. Two of the presently produced manuals will be discontinued or substitutes found. The sales of the Atlas of Otolaryngic Pathology have jumped this past year. The AFIP withheld 400 copies when the Atlases were transferred from Washington to Rochester, Minnesota, in November, 1958. The National Academy of Sciences sold before November 3, 1958, 1,223; donated to libraries 48; retained 400. Total, 1,671. Copies numbering 1,525 were sent to Rochester, Minnesota, and during 1959 and to October 1, 1960, approximately 715 were sold. A few were lost or damaged in transit. There are about 800 copies remaining which should be ample for the next three years. The Committee on Otolaryngic Pathology will be asked to consider a revised edition.

The Atlas of Ophthalmic Pathology has been rewritten by the Committee on Ophthalmic Pathology and a new book will be released within a few weeks. The new textbook-atlas was built on the groundwork of the 1952 Atlas with a major rearrangement of all material and the addition of new material. The responsibility for the final arrangement was assumed by Doctors Hogan and Zimmerman who spent several weeks in San Francisco on the manuscript and proof. The Academy is proud of this production and acknowledges its deep gratitude to the Committee for this outstanding contribution to medical education. Approximately 4,600 copies of the 1952 Atlas of Ophthalmic Pathology have been distributed.

18. The Academy has sponsored no new pictures. The Embryology of the Eye motion picture and film strips as well as the 2 × 2 kodachrome slides are still available and several sets have been ordered the past year. The motion picture film, Embryology of the Ear is much more expensive but a few orders have been filled. Total orders for the motion pictures are, Embryology of the Ear, 22, Embryology of the Eye 80. Several orders have come from foreign countries.

19. The following report on the Academy insurance program has been received in the Secretary's office:

During the year 1952 the Academy under the guidance of its officers and Executive Council studied various Programs of Group insurance that could be made available to members of the Academy. On the date of July 1, 1952, the first program of group insurance was conceived and made a reality for the members. Subsequently the Academy's Portfolio of Group Insurance has been broadened to include the following Programs:

1. Accident-Sickness Disability Income Protection
2. Accidental Death, Dismemberment and Loss of Eyesight Protection
3. Professional Liability Insurance Protection
4. Professional Overhead Expense Insurance
5. Major Hospital Insurance
6. Group Life Insurance
7. Retirement-Income Annuity
8. Accident-Sickness Disability Income for Employees of a Member
9. Group Life Insurance for Employees of a Member

1. ACCIDENT-SICKNESS DISABILITY INCOME PROTECTION (Underwriting Company—Continental Casualty Company)

This Program of Group Insurance was made available to members of the Academy on the date of July 1, 1952. It provided three plans of coverage the member may elect to

participate in. The first plan provides the insured member $50.00 weekly while he is disabled, the second plan provides $75.00 weekly, and the third plan $100.00 weekly. In addition to the income benefits, there are benefits for Partial Disability, Hospital Confinement, Accidental Death, Dismemberment and Loss of Eyesight, and Polio and Dread Disease Expense Benefits. If the disability is due to sickness, benefits are payable from the first day of hospitalization or the eighth day of disability and may continue for as long as two years under the Basic Plan or for as long as five years under the Extended Plan. If disability is due to accident, income benefits are payable from the first day of disability and for as long as a lifetime in both the Basic Plan and the Extended Plan.

On the date of July 1, 1954, the basic Academy Program was broadened because of good experience, to include an Extended Plan, which is mentioned above.

On the date of July 1, 1959, the Weekly Income Benefits were increased 10 per cent at no additional premium, because of good experience.

On the date of July 1, 1960, the Weekly Income Benefits were broadened to include a Plan of $125.00 Weekly Income Benefits and still another plan of $150.00 Weekly Income Benefits.

Presently there are 1,900 members insured under this Program.

2. ACCIDENTAL DEATH, DISMEMBERMENT AND LOSS OF EYESIGHT PROTECTION (Underwriting Company—Employers Mutual Casualty Co.)

This Program of Insurance was made available to members of the Academy on the first day of March 1956. It provides up to $200,000 of protection for Accidental Death, Dismemberment and Loss of Eyesight.

On the date of October 15, 1957, and because of good experience, the Academy's Program was broadened to make this coverage available to the spouse of the member.

On the date of March 1, 1958, a reduction in premium was effected with this Program. The original rate of premium was $1.35 per $1,000 on the first $100,000 of coverage. The new rate schedule affords a premium of $1.25 per $1,000 for the first $100,000 of coverage.

This rate reduction was made possible through good experience.

There are presently 445 members insured under this Program.

3. PROFESSIONAL LIABILITY INSURANCE (Underwriting Company—Interstate Fire and Casualty Company)

On March 1, 1959, due to the high loss ratio experience of the Employers Mutual Casualty Company, they asked for termination of the above Program, and this coverage was placed with the Interstate Fire and Casualty Company. The rate of premium charged by the Interstate is as much as 20 per cent below State Bureau Individual Rates. There are only three States, namely, Washington, Oregon and Florida, where this rate reduction cannot be applied.

The Interstate Fire and Casualty Company experience to date has been most satisfactory and the continuance of good experience eventually should effect a rate reduction.

Since the Interstate Fire and Casualty Company have taken over this coverage, they have increased the limits from $100,000/300,000 to $200,000/600,000 limits, which was a request from many of the Academy Members that the Interstate Fire and Casualty Company agreed to.

Presently there are 1,250 members insured under this Program.

4. PROFESSIONAL OVERHEAD EXPENSE INSURANCE (Underwriting Company—American Casualty Company)

On the date of November 1, 1957, a Program of Overhead Expense Insurance was made available to Academy members providing up to $1,000 per month coverage. This program provides the insured member reimbursement of office expenses incurred while he is disabled and unable to perform his professional duties.

5. MAJOR HOSPITAL INSURANCE (Underwriting Company—American Casualty Company)

This Program of Group Insurance was made effective November 1, 1958.

This Program provides the member and his dependent family up to $15,000 of Hospital Expense Coverage. There are three plans to choose from: $100.00 deductible, $300.00 deductible, and $500.00 deductible.

Presently there are 605 members insured under this Program and applications are being received daily.

6. GROUP LIFE INSURANCE
(Underwriting Company — Massachusetts Mutual Life Insurance Co.)

So that the Academy would have a complete portfolio of insurance, a Program of Group Life Insurance was made effective January 1, 1959.

The Group Life Insurance Program provides the member maximum coverage at attained age for a minimum annual deposit of $100.00. This coverage is continued to age 70.

Presently there are 246 members insured under this Program and applications are being received daily.

7. GROUP RETIREMENT-ANNUITY PROGRAM
(Underwriting Company — Massachusetts Mutual Life Insurance Co.)

This Program was made available on the basis of a member contributing from $200.00 annually up to no maximum. The Retirement Income starts at age 65 and due to this Program being on a group basis, it provides up to a 10 per cent advantage in income benefits at age 65 compared to comparable coverage purchased on an individual basis.

Presently there are 49 members participating in this Program.

8. ACCIDENT-SICKNESS DISABILITY INCOME PROTECTION FOR EMPLOYEES OF A MEMBER
(Underwriting Company—Continental Casualty Company)

This Program of Insurance is similar in every respect to the member's Accident-Sickness Disability Income Protection Program, however, the Monthly Income Benefits are limited to $300.00.

This Program provides the employee of a member an opportunity to make an outstanding savings in premium with maximum benefits being offered. It is important to note that this is an outstanding service to the member where his employees are concerned.

This Program had its inception on the date of March 1, 1960, and presently there are 305 employees participating.

9. GROUP LIFE INSURANCE FOR EMPLOYEES OF A MEMBER
(Underwriting Company — Massachusetts Mutual Life Insurance Co.)

This Program of Insurance provides maximum Life Insurance Protection at a minimum annual premium of $25.00.

The Program had its inception on the date of June 1, 1960, and presently there are eighty-seven employees participating.

20. Report on the 1959-1960 Home Study Courses:

Yearly Summary of Activities
October 1960

REGISTRATIONS

The following is a record of registrations for the Home Study Courses since they were started in 1940:

YEAR	OPHTHALMOLOGY	OTOLARYNGOLOGY	TOTAL
1940-1941	301	114	415
1941-1942	238	117	355
1942-1943	163	81	244
1943-1944	126	74	200
1944-1945	175	84	259
1945-1946	290	112	402
1946-1947	353	191	544
1947-1948	436	220	656
1948-1949	375	230	605
1949-1950	317	184	501
1950-1951	244	117	361
1951-1952	301	130	431
1952-1953	240	105	345
1953-1954	265	111	376
1954-1955	235	134	369
1955-1956	254	125	379
1956-1957	279	156	435
1957-1958	259	122	381
1958-1959	272	171	443
1959-1960	291	189	480
TOTALS	5,414	2,767	8,181

The 1960-1961 registrations will probably be about the same as for last year, with an increase in Ophthalmology and a decrease in Otolaryngology. Present enrollments are: Ophthalmology 308, Otolaryngology 165, Total 473.

Some comparative figures on the percentage of registrants who have sent in all papers for the Courses:

YEAR	OPHTHALMOLOGY	OTOLARYNGOLOGY
1956-1957	33%	36%
1958-1959	42%	43%
1959-1960	40%	47%

FACULTIES

During the past year the following changes have been made in the faculties:

New Appointments

For Ophthalmology

John F. McKenna
(Associate for Ocular Microbiology, External Diseases and Aseptic Technique)
Edmond L. Cooper
(Associate for Extraocular Muscles)

For Otolaryngology

William H. Saunders
(Associate for Physiology)
Walter H. Maloney
(Associate for Pharmacology)

Changes in Status

For Ophthalmology

Senior to Consultant:
Hunter H. Romaine

Associate to Senior:
Hermann M. Burian

Resigned:
Joseph A. C. Wadsworth

For Otolaryngology

Senior to Consultant:
G. O. Proud

Associate to Consultant:
Hollie E. McHugh

Associate to Senior:
Kinsey M. Simonton

APPRECIATION NOTES

Engraved notes of appreciation are sent to nonfaculty members who assist with the marking of papers. These notes have the personal signatures of the President and the Executive Secretary-Treasurer of the Academy, and of the Secretary and Associate Secretary for Home Study Courses. The names of individual recipients are engrossed on the notes.

PUBLICITY

The following media were used during the past year for publicizing the Home Study Courses:

Announcements in the specialty journals for Ophthalmology and Otolaryngology

Poster announcements sent to heads of departments of Ophthalmology and Otolaryngology in medical schools, and in hospitals approved for residency training

Listing in the Postgraduate Courses issue of the A.M.A. Journal

Miscellaneous editorials and announcements in the Academy TRANSACTIONS.

PRE-LUNCHEON MEETINGS

During the 1959 Meeting the Ophthalmology and Otolaryngology faculties met separately before the Faculty Luncheon, for brief discussions of matters related to their respective Courses. A favorable vote resulted in the decision to have similar meetings again in 1960.

DISCUSSION PERIODS

Discussion Periods related to the Home Study Course in Ophthalmology are scheduled as a part of the 1960 program of instruction courses. They are set up as a ten-hour continuous course. The cost is $20.00, except that 1959-1960 registrants for the Home Study Course in Ophthalmology have been notified that complimentary tickets are available to them.

EXHIBIT

A Home Study Courses exhibit is being shown this year in the West Corridor adjacent to the Foyer to the Grand Ballroom.

FREE REGISTRATION FOR THE ACADEMY MEETING

Registrants for the 1959-1960 Home Study Courses were offered free registration for the Academy Meeting this year.

NEWS NOTE

Dr. Knud K. Dreisler of Denmark, enthusiastic advocate of the Home Study Courses, is continuing the Course in Ophthalmology in Denmark, Norway and Sweden. He reports that in June of this year he spoke on "The role of the Home Study Course in the future training of ophthalmologists in Scandinavia" before the XV Scandinavian Congress of Ophthalmology in Oslo.

DANIEL SNYDACKER, M.D.
PETER N. PASTORE, M.D.
October 1960 Secretaries

Dr. Ruedemann moved that the report of the Executive Secretary be accepted as read. The motion was seconded by Dr. Schall and carried.

II

The Treasurer, Dr. Benedict, submitted the audit for 1959 made by Byers, Wobschall and Miller, Certified Public Accountants, and the financial status of the Academy as of September 30, 1960. (*The audit for* 1959 *appeared in the July-August* 1960 *issue of the* TRANSACTIONS. *The financial status of the Academy as of September* 30, 1960, *uncertified, is published herewith.*)

EXHIBIT "A"

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
Balance Sheet as of September 30, 1960

ASSETS

Current Assets:			
Cash on Hand		$ 25.00	
Cash in Banks:			
Northwestern National Bank of Rochester	$125,445.49		
Olmsted Savings and Loan Ass'n., Rochester	25,000.00		
Bank of Montreal, Toronto, Canada	4,130.16	154,575.65	
Checks held for collection		20.00	
Membership dues, delinquent		820.00	
Accounts receivable, others		2,934.38	
Inventories:			
Abstracts, Manuals, Monographs and Bound Volumes	$ 25,911.02		
EMBRYOLOGY OF THE EAR album of prints	226.49		
EMBRYOLOGY OF THE EYE filmstrips and slides	1,180.00		
ATLAS OF OTOLARYNGIC PATHOLOGY	13,875.82	41,193.33	
Total Current Assets			$199,568.36
Investments:			
Wherry Memorial Fund			
Rochester Building and Loan Association		$ 5,400.00	
Total Investments			5,400.00
Fixed Assets:			
Furniture and fixtures	$ 21,692.92		
Less: Reserve for depreciation	13,180.59	$ 8,512.33	
EMBRYOLOGY OF THE EAR film project	$104,516.62		
Less: Reserve for depreciation	57,093.42	47,423.20	
EMBRYOLOGY OF THE EYE film project	$ 41,775.00		
Less: Reserve for depreciation	41,775.00	—0—	
Total Fixed Assets			55,935.53
Deferred Charges:			
ATLAS OF SLIT-LAMP GONIOSCOPY		$ 15,885.35	
Prepaid expenses		3,755.00	
Prepaid insurance		427.25	
Prepaid postage		82.68	
Total Deferred Charges			20,150.28
TOTAL ASSETS			$281,054.17

LIABILITIES AND NET WORTH

Current Liabilities:			
Accounts payable		$ 431.88	
Accrued Withholding tax		950.95	
Accrued Social Security tax		195.50	
Advance payments:			
Bound Volumes		4,035.00	
Manuals		6.00	
Membership dues		92.50	
Total Current Assets			$ 5,711.83
Undisbursed Funds From Special Contributions:			
Wherry Memorial Lecture Fund		$ 6,301.55	
Subcommittee on Conservation of Hearing in Children		4,580.00	
N. I. H. Grants-In-Aid:			
Grant B2359—Uveitis Research	$ 64,412.78		
Grant B2375—Hearing in Children	53,257.93		
Grant 2-B-5296—Employment Registry for Scientists	**202.16**	117,468.55	
Total Undisbursed Funds from Special Contributions			128,350.10
Net Worth:			
Surplus—January 1, 1960	$490,822.64		
Excess Income over Expenses—year to date	96,956.12	$587,778.76	
Securities transferred to Educational Trust	$372,674.46		
Advance in Market Values of Securities as of 12/31/59	68,112.06	**440,786.52**	
Total Net Worth			146,992.24
TOTAL NET WORTH AND LIABILITIES			$281,054.17

Note: As of August 1, 1960 and September 26, 1960, investments in securities costing $372,674.46 were transferred to the First National Bank of Minneapolis as Trustee of the Educational Trust established by the American Academy of Ophthalmology and Otolaryngology and becoming effective as of August 1, 1960.

Dr. Schall moved that the report of the Treasurer be accepted as read. Dr. Dunphy seconded the motion, which carried.

III

The report of the Editor of the TRANSACTIONS was read by Dr. Benedict, Editor-in-Chief, as follows:

October 1, 1960

REPORT OF EDITOR OF TRANSACTIONS

During the year just past, an average of 8,711 copies of the TRANSACTIONS were printed bimonthly. Of these, 975 were set aside for bound volumes, and an average of 7,679 mailed, an increase in circulation of 220 over last year. The following categories are represented:

Fellows	6,701
Candidates	141
Subscribers	531
Libraries	112
Exchange and Miscellaneous	79
Advertisers and Agents	67
Complimentary	46
Single copies	59

Eight hundred and thirty-two orders for the 1960 bound volume have been received to date.

The *revenue* from the TRANSACTIONS for the period from September 1, 1959, through August 31, 1960, was as follows:

Subscriptions:	
Members	$40,236.00
Candidates	1,722.00
Nonmembers	5,446.00
Bound Volumes	4,621.50
Single Issues	236.75
American Orthoptic Journal	1,312.00
Advertising	27,854.07
Reprints	8,611.39
Total Revenue	$90,039.71

The *expenditures* for the TRANSACTIONS for the period from September 1, 1959, through August 31, 1960, were as follows:

Bimonthly Issues	$40,117.58
Bound Volumes	2,534.21
American Orthoptic Journal (Both 1959 & 1960 issues)	10,800.00
Cash Discount Allowed	448.66
Paper Stock and Envelopes	16,178.38
Freight and Express	57.72
General Expense	88.30
Postage	1,870.79
Reprints	5,800.10
Salaries	15,172.71
Social Security Tax	407.34
Total Expenditures	$93,475.79
Expenditures over Revenue	$ 3,436.08

The past six issues have averaged 172 pages per issue, exclusive of advertising and including news notes, directory of societies, committee reports, positions available and miscellaneous notices. The Directory of Ophthalmologic and Otolaryngologic Societies is printed twice a year, in the March-April and the September-October issues.

The average number of pages of paid advertising was 33.67, representing 41 advertisers.

One new manual has been published during the past year: "A Guide to the Care of Adults with Hearing Loss" by Lawrence R. Boies, M.D., and other members of the Committee on Conservation of Hearing. The manual by H. Saul Sugar, M.D., "Extrinsic Eye Muscles," and Ted Suie's "Microbiology of the Eye" have been revised. A report on a hearing symposium held under Federal auspices in Washington, D. C., was issued as a supplement to the November-December 1959 TRANSACTIONS: "Health Aspects of Hearing Conservation." A manual by Wendell L. Hughes, M.D., and other members of the Committee on Plastic Surgery for Ophthalmology, "Plastic Surgery of the Eye," and another by Jack Van Doren Hough, M.D., "Malformations and Anatomical Variations Seen in the Middle Ear During Operations on the Stapes," are in progress. The Hough manual will be published within a few weeks. The Hughes manual will be ready about the first of next year.

A stereoscopic atlas, "Stapes Operations in 3-D," by J. Brown Farrior, M.D., is in the press and will be ready for publication soon.

The tenth volume of the American Orthoptic Journal was published in April. The number printed was 2,675. Following the policy adopted three years ago, the Journal is sent only to those members of the Academy requesting it. It is mailed to all members of the Association of Orthoptic Technicians in good standing; two dollars of each member's dues are allocated for subscription.

Dr. Hansen moved that the report of the Editor be accepted as read. Dr. Byrnes seconded the motion, which carried.

IV

The Necrologist's Report to the Council was presented by Dr. Benedict.

[This report was published in the September-October 1960 issue of the TRANSACTIONS.]

President Lierle instructed the Secretary to file the report.

V

OLD BUSINESS

None

VI

COMMUNICATIONS

1. Communications were read from Paul H. Holinger, Chairman of the Committee on Otolaryngic Pathology, and from Joe M. Blumberg, Colonel, USA, MC, Scientific Director of the American Registry of Pathology, requesting that the Academy consider resuming financial support to the American Registry of Pathology. The letter from Colonel Blumberg furnished information concerning the support that is needed.

Dr. Benedict moved that the Council recommend to the Finance Committee that we resume contributions to the Registries of Pathology of $2,500 per year. The motion was seconded by Dr. Hansen and carried.

Dr. Byrnes suggested that an investigation be made into whether the National Institutes of Health could take over support of the Registries. President Lierle instructed the Executive Secretary-Treasurer to make such an investigation.

2. Eliott B. Hague of Buffalo, New York, submitted to the Executive Secretary-Treasurer a "Rationale for Formation of Ophthalmic Teams for Foreign Service." This communication was referred to the Committee on Research and Finance.

3. Under date of October 4, 1960, Peter H. Ballen requested that the Academy sponsor a charter trip to the International Congress of Ophthalmology, which will be held in New Delhi, India, in December 1962, and that the Academy deal directly with one of the chartering agencies.

4. Through its Executive Director, James A. Morrison, the Convention and Visitors Bureau of the Chamber of Commerce of Greater Philadelphia wrote under date of August 9, 1960, to offer its facilities for a meeting of the Academy in Philadelphia in 1965 in conjunction with the 200th anniversary of the founding of the Nation's first medical school at the University of Pennsylvania.

Dr. Snydacker moved that this matter be left to the Executive Secretary-Treasurer and the Program Committee. The motion was seconded by Dr. Schall and carried.

5. A letter dated November 30, 1959, from John Mackenzie, Executive Secretary of the Institute for Advancement of Medical Communication, extended an invitation to designate a representative to the permanent Council on Medical Television.

Dr. Goodhill moved that the Executive Secretary-Treasurer of the Academy serve as its representative. The motion was seconded by Dr. Schall and carried.

VII

Report of the Executive, Research and Finance Committee—Dean M. Lierle, Chairman.

1. The Committee recommends that the application fee for fellowship in the Academy continue to be $25.00; and that for the year 1961 the annual dues for Active Fellows shall be $25.00; for Associate Fellows, $12.50. The allotment from dues and from application fees for subscriptions to the TRANSACTIONS shall be continued at $7.00.

Dr. Benedict moved that the recommendations of the Committee be accepted. The motion was seconded by Dr. Snydacker and carried.

2. The Committee recommends that five Fellows who have been delinquent in the payment of dues for a period of more than three years be dropped from the Academy roster, and that action on a sixth delinquent Fellow be deferred pending further information.

Dr. Benedict moved that the recommendations of the Committee be accepted. The motion was seconded by Dr. Byrnes and carried.

3. The Committee recommends that the resignations of four Fellows be accepted.

Tyler David Blasdel .....Parsons, Kansas
Edmund O. Gates .....Welch, W. Va.
John J. Levbarg .....Flushing, N. Y.
F. Earle Magee .....Oil City, Pa.

Dr. Benedict moved that the recommendations of the Committee be accepted. The motion was seconded by Dr. Goodhill and carried.

4. The Committee recommends that the requests of fifteen Fellows for Inactive Status be granted.

Ellis McFerrin Altfather .....Denver, Colo.
George Maury Campbell .....Inez, Texas
Lee W. Dean, Jr. .....St. Louis, Mo.
Abraham Harold Delman ...Brockton, Mass.
Ann Filak-Perez .....Winter Haven, Fla.
F. Barker Jones .....Hendersonville, N. C.
Sol Malis .....Escondido, Calif.
Bernard Eugene O'Reilley ...St. Paul, Minn.
J. Frederick Sarno .....Johnstown, N. Y.
Harold R. Smithies .....Alameda, Calif.
Walter C. E. Spencer .....Houston, Texas
Gerald D. Spero .....Detroit, Mich.
Charles Edward Stanford .....Elcho, Wis.
Otto William Wickstrom ..Indianapolis, Ind.
George E. Wilson .....Saranac Lake, N. Y.

Dr. Benedict moved that the recommendations of the Committee be accepted. The motion was seconded by Dr. Ruedemann and carried.

5. The Committee recommends that the request of J. Norman Reeves for reclassification from Inactive Fellow to Active Fellow be granted provided that his back dues are paid.

Dr. Benedict moved that the recommendation of the Committee be accepted. The motion was seconded by Dr. Roper and carried.

6. The Committee recommends for Honorary Fellowship, Jesus Rhode of Caracas, Venezuela.

Dr. Benedict moved that the recommendation of the Committee be approved. The motion was seconded by Dr. Pischel and carried.

[At the Wednesday session of the Council, the recommendation of the Board of Councillors that Joaquin Barraquer of Barcelona, Spain, be made an Honorary Fellow of the Academy was approved by the Council as a whole.]

7. The Committee recommends the following appointments:

As Chairman of Standing and Joint Committees for the year 1961:

To the Committee on Audio-Visual Education, Dean M. Lierle

To the Committee on Conservation of Hearing, Dean M. Lierle

To the Committee on Implants and Implant Techniques, A. D. Ruedemann

To the Committee on Ophthalmic Pathology, Michael J. Hogan

To the Committee on Otolaryngic Pathology, Paul H. Holinger

To the Committee on Reconstructive Plastic Surgery, John Marquis Converse and Wendell L. Hughes, Co-chairmen

To the Committee on Research in Otolaryngology, Gunnar Proud

To the Committee on Scientific Exhibit, Kenneth L. Roper, Chairman, and Eugene L. Derlacki, Co-chairman

To the Committee on Standardization of Tonometers, E. J. Ballintine

To the Teachers' Sections: Ophthalmology and Otolaryngology, A. D. Ruedemann, Chairman, and John A. Kirchner, Co-chairman

Representative of the Academy to:

American Association for the Advancement of Science, M. Elliott Randolph.

American Board of Ophthalmology, F. Phinizy Calhoun, Jr., for a 4-year term beginning January 1, 1961.

American Board of Otolaryngology, Francis E. LeJeune and George F. Reed.

American College of Surgeons Board of Governors, LeRoy Schall, George A. Sisson, and James A. Moore—these names to be submitted for consideration by the American College of Surgeons and one selected by them for the term ending in 1964.

American Committee on Optics and Visual Physiology, Goodwin Breinin for a term of three years beginning January 1961.

American Orthoptic Council, John W. Henderson for a term of three years beginning January 1961.

American Standards Association, Acoustical Standards Board, Edmund P. Fowler, Jr.

American Standards Association, Committee for Standardization of Ophthalmic Lenses, Carl J. Rudolph and Arthur C. Linksz.

Institute for Advancement of Medical Communication, Council on Medical Television, William L. Benedict.

National Committee on Research in Ophthalmology and Blindness, Bernard Becker and A. Edward Maumenee.

National Congress of Parents and Teachers, Frank D. Costenbader.

National Society for Crippled Children and Adults, Inc., Dean M. Lierle.

Interim Appointments:

To A.M.A. Ad Hoc Committee on Atomic Medicine and Ionizing Radiation, Walter Benedict.

To Advisory Committee to Audio-Visual Committee of the Museum of Science and Industry, Chicago, Kenneth L. Roper, Chairman; Daniel Snydacker, Albert M. Potts, Joseph R. Fitzgerald and Paul Sternberg.

To Pan European Ophthalmological Society, John H. Dunnington (Athens, Greece, April 1960).

The Committee also recommends that the Committee on Use of Diagnostic Procedures and Therapy in Uveitis be discontinued.

The Committee further recommends that no representatives be appointed to the Joint Committee on Eye Banks, since the Joint Committee requests that it be dissolved.

Dr. Benedict moved that the recommendations of the Committee be approved. The motion was seconded by Dr. Dunnington and carried.

8. The Committee recommends the nomination of William L. Benedict as Editor-in-Chief of the TRANSACTIONS.

The nomination was approved by acclamation.

9. The Committee recommends that the next annual meeting of the Academy be held October 8 to 13, 1961, at the Palmer House in Chicago.

Dr. Benedict moved that the Council approve the recommendation. The motion was seconded by Dr. Hansen and carried.

10. The Committee recommends the following appropriations for the calendar year 1961:

To the Committee on Conservation of Hearing, a sum not to exceed $20,000; $7,500 of this to be earmarked for the Subcommittee on Noise to be used for educational purposes, and $5,000 is earmarked for the Subcommittee on Hearing in Children.

To the Committee on Research in Otolaryngology, $2,000 for cash awards.

To the Committee on Standardization of Tonometers, $2,000.

To the American Committee on Optics and Visual Physiology, $200.

To the American Orthoptic Council, $200.

To the National Committee on Research in Ophthalmology and Blindness, $500.

To the International Federation of Ophthalmological Societies for dues for the year 1961, $300.

To the National Society for Medical Research, $1,000.

To the salary of a consultant at the Armed Forces Institute of Pathology, $7,000.

To a fellowship in Ocular Pathology at the Armed Forces Institute of Pathology, $600 a month for a 12-month period.

To the Registries of Pathology, $2,500.

A motion by Dr. Benedict to approve the recommendations of the Committee was seconded by Dr. Schenck, and carried.

VIII

Report of the Activities Committee—Victor A. Byrnes, Chairman.

The Committee recommends acceptance of reports from the following Standing Committees:

Audio-Visual Education
Conservation of Hearing
Implants and Implant Techniques
Ophthalmic Pathology
Otolaryngic Pathology
Research in Otolaryngology
Standardization of Tonometers
Use of Diagnostic Procedures and Therapy in Uveitis

The Committee also recommends acceptance of reports of representatives of the Academy to the following organizations:

American Association for the Advancement of Science
American Board of Ophthalmology
American Board of Otolaryngology
American College of Surgeons
American Committee on Optics and Visual Physiology
American Orthoptic Council
American Standards Association, Acoustical Standards Board
American Standards Association, Committee for Standardization of Ophthalmic Lenses
Joint Committee on Eye Banks
National Committee on Research in Ophthalmology and Blindness
National Congress of Parents and Teachers
National Society for Crippled Children and Adults, Inc.

It is understood that these reports will be published in the November-December issue of the TRANSACTIONS.

Dr. Byrnes moved that the report be accepted. The motion was seconded by Dr. Dunnington, and carried.

IX

Report of the Board of Councillors—Victor A. Byrnes, Chairman.

1. Applications from 232 candidates for Active Fellowship have completed all requirements, have been passed by the Board of Councillors and are recommended to the Council for acceptance.

Ted Suie, bacteriologist from Ohio State University Department of Ophthalmology, is recommended for Associate Fellowship.

Juergen Tonndorf, University of Iowa Department of Otolaryngology, who applied for Active Fellowship, was approved for Associate status, and it was recommended that the application fee of $25.00 be refunded.

Joaquin Barraquer of Barcelona, Spain, who had applied for Active Fellowship, was referred back to the Council with a recommendation for Honorary Fellowship.

One application for Associate Fellowship was rejected.

Twelve applications for Active Fellowship were rejected and it was recommended that the application fee be refunded.

Dr. Byrnes moved that the recommendations of the Board be approved. The motion was seconded by Dr. Snydacker, and carried.

2. The Board of Councillors nominated the following officers for 1961:

President: Dohrmann K. Pischel, San Francisco

President-Elect: Lawrence R. Boies, Minneapolis

First Vice-President: Frederick T. Hill, Waterville, Maine

Second Vice-President: Maynard Wheeler, New York

Third Vice-President: Leland G. Hunnicutt, Pasadena, Calif.

Councillor: Michael J. Hogan, San Francisco

Executive Secretary-Treasurer: William L. Benedict, Rochester, Minn.

Dr. Byrnes moved that the nominations of the Board of Councillors be approved. The motion was seconded by Dr. Dunnington, and carried.

X

NEW BUSINESS

1. On Saturday, October 8, at three o'clock Jack R. Anderson and Theodore E. Walsh requested audience and were received by the Council. Their purpose was "to request that the Council, as the representative of the largest group of eye, ear, nose and throat specialists in the United States, take appropriate action in the form of a protest to the American Medical Association and other authoritative Boards in organized medicine in regard to recent articles on Plastic Surgery which have maligned that segment of our specialty which concerns itself with that type of work."

Dr. Anderson presented the following communication:

[On file in the Academy Office.]

When the delegation had withdrawn, the matter was taken under advisement. It was the consensus of the Council that direct action was not within the province of the Academy, but lay with the Advisory Board for Medical Specialties. President Lierle appointed a committee composed of Harold Scheie, chairman; Eugene L. Derlacki, Victor Goodhill and Dohrmann K. Pischel to draft a letter to the Advisory Board urging action.

On Wednesday, October 12, Dr. Anderson again appeared before the Council, together with Jesse Fuchs, to present additional information. [A copy of this report is on file in the Academy office.]

In view of this additional information, several changes were suggested in the letter which had been drafted by the committee appointed by Dr. Lierle. The final draft follows:

October 13, 1960

Dr. L. A. Buie, M.D.
Advisory Board for Medical Specialties
Kahler Hotel
Rochester, Minnesota

Dear Doctor Buie:

A very unfortunate article appearing in *Harper's Bazaar* June 1960, as well as others which preceded and followed it in several different lay publications was brought to the attention of the Council of the American Academy of Ophthalmology and Otolaryngology at its Annual Meeting in Chicago, October 8, 1960.

The Council was disturbed to learn that these articles belittle the qualifications of some physicians, including diplomates of several different American specialty boards, among which are the two oldest. In reality, the articles utilize certification by a specialty board for the aggrandizement of one group of physicians, even to the point of embarrassment of others.

This Council believes that the entire matter deserves your consideration, and recommends appropriate action.

Respectfully yours,
Executive Secretary-Treasurer

Dr. Allen moved that this letter be sent to the Advisory Board for Medical Specialties, and that copies of the letter be sent to the secretaries of all other member specialty boards. The motion was seconded by Dr. Goodhill and passed unanimously.

2. Dr. Benedict nominated the following men for appointment to the secretarial offices of the Academy:

Secretary for Ophthalmology: Kenneth L. Roper

Secretary for Otolaryngology: Clair Kos

Secretary for Instruction in Ophthalmology: A. D. Ruedemann

Secretary for Instruction in Otolaryngology and Maxillofacial Surgery: Eugene L. Derlacki

Secretary for Home Study Courses: Dean M. Lierle

Secretary for Public Relations: Glen G. Gibson

The nomination was seconded by Dr. Byrnes and carried.

Dr. Benedict said that he was pleased that Dr. Lierle had been willing to accept the post of Secretary for Home Study Courses, and that he felt confident that Dr. Lierle would do the job well.

He expressed regret in accepting the resignation of Dr. Snydacker, and wished to thank Dr. Snydacker personally for his services on the Council.

Dr. Hansen moved that the Council as a whole thank Dr. Snydacker for all he had done as a member of the Council. The motion was seconded by Dr. Dunphy, and carried.

The meeting of the Council recessed until Wednesday, October 12, at 12:45 p.m.

Wednesday meeting of the Council

3. Dr. Benedict read a resolution signed by George A. Sisson regarding the establishment of a Committee on Head and Neck Surgery:

October 11, 1960

Resolution:

That a Council Committee on Head and Neck Surgery be established.

That the Committee be directly responsible to the Council of the American Academy of Ophthalmology and Otolaryngology and abide by the Constitution of the Academy in its practices and privileges.

That the Committee advise with the Program Committee of the Academy in matters of programming and teaching.

That the Council name a Committee chairman, who would appoint a committee of responsible men whose prime interest is in surgery of the head and neck.

That the chairman of the Committee report as often as necessary to the Academy Council as to its activities and proposed programs.

Proposed by: George A. Sisson
Syracuse, New York

Dr. Benedict moved that this request be granted, and that George A. Sisson be named as Chairman of a Committee on Surgery of the Head and Neck. The motion was seconded by Dr. Schenck, and carried.

4. Dr. Benedict read a resolution from the Joint Committee on Eye Banks dated October 12, 1960.

Resolved, that since the Council of the American Academy of Ophthalmology and Otolaryngology has voted that representation to the Joint Committee on Eye Banks be discontinued, the present Joint Committee recommends that the Council form a standing committee on eye banks; and that this committee be permitted to establish an "American Association of Affiliated Eye Banks" for the purpose of advising in the ethical conduct and medical standardization of eye bank functions.

It is recommended that the chairman of this committee be R. Townley Paton, M.D., and the secretary, John Harry King, M.D., and that an appropriation of $500 be made to cover the expenses of the committee.

Dr. Ruedemann moved that the Council establish a Committee on Eye Banks, with R. Townley Paton as chairman and John Harry King as secretary, and that an appropriation of $500 be made to cover the expenses of the Committee. The motion was seconded by Dr. Allen.

DR. SNYDACKER: I should like some information about the purposes of the proposed American Association of Affiliated Eye Banks.

DR. RUEDEMANN: Its purpose would be to build a code of ethics which could be used in controlling various eye bank groups and to work toward a standardization of procedures.

DR. BENEDICT: In establishing this Committee, it should be understood that we leave it free to build its own program, and we do not automatically endorse an action made by the Joint Committee. We are not committing ourselves to anything more than establishment of a standing committee.

The vote was called for, and the motion carried.

5. Dr. Benedict called attention to the fact that the Council had accepted the recommendation that Joaquin Barraquer of Barcelona, Spain, be granted Honorary Fellowship. Dr. Barraquer had applied for Active Fellowship and had paid a fee of $25.00. Dr. Benedict asked for instruction regarding disposition of this fee.

A motion by Dr. Byrnes, seconded by Dr. Dunphy, instructed the Executive Secretary-Treasurer to make a refund to Dr. Barraquer of $25.00.

6. Dr. Pischel expressed concern that exclusion of South Americans and other foreign specialists from Academy membership was not conducive to a Good Neighbor policy. Dr. Goodhill suggested that we consider a type of membership common in foreign societies, "corresponding member." Dr. Benedict pointed out that adoption of this new classification would require a revision of the Constitution. President Lierle appointed a committee consisting of John Dunnington, chairman; Edwin Dunphy, Victor Goodhill, and Harry Schenck to assist the Executive Secretary-Treasurer in a thorough study of the advisability of such action and to report at the next Council meeting.

7. Dr. Dunphy called attention of the Council to a statement of Lorenz Zimmerman in the Jackson Memorial Lecture that there was a great need for a Registry of Living Ophthalmic Pathology. Dr. Dunphy moved that the Committee of Ophthalmic Pathology be asked to explore the possibility of establishing such a registry. At the request of Dr. Lierle, the motion was changed to include a similar request to the Committee on Otolaryngic Pathology regarding such a registry in otolaryngology. The motion was seconded by Dr. Schenck and carried.

Since no further business was brought before the Council, the meeting adjourned.

ANNUAL BUSINESS MEETING

Thursday, October 13, 1960, 5:30 P.M.

PRESIDENT LIERLE: The business meeting of the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology will come to order.

The first item on the agenda is the report of the Executive Secretary, Dr. William L. Benedict.

DR. BENEDICT: I am submitting to you a condensed report. Further detailed information is available in the files of the Academy.

The fellowship as of January 1, 1960, which is the beginning of our fiscal year, was:

Active	5,804
Life	950
Honorary	29
Inactive	130
Associate	10
Total	6,923

Two hundred and thirty-two candidates who had completed all requirements for membership have been considered by the Council and recommended for Active Fellowship. Two candidates have been recommended for Associate Fellowship, and two for Honorary Fellowship. One Fellow who had Inactive status has requested to be returned to Active Fellowship; this request has been approved pending receipt of back dues.

Eighty-three deaths have been reported since our last Annual Meeting.

Four Fellows have tendered their resignations during the past year. Requests for Inactive Fellowship have been approved for 15 Fellows. Five Fellows have been dropped for nonpayment of dues for a period of more than three years.

Mr. President, I move the acceptance of this portion of the report.

The motion was seconded by Dr. A. D. Ruedemann and carried.

PRESIDENT LIERLE: The next item on the agenda is the report of the Treasurer, Dr. Benedict.

DR. BENEDICT: The certified accountant's audit of the affairs of the Academy as of December 31, 1959, was published in the July-August 1960 issue of the TRANSACTIONS. It is a rather lengthy report, and inasmuch as it has been published, I question whether you want to hear the report in full.

PRESIDENT LIERLE: What is your pleasure?

Dr. Kenneth Roper moved that the reading of the Treasurer's report be omitted. The motion was seconded by Dr. Carroll Mullen and carried.

PRESIDENT LIERLE: Next is the report of the Senior Member of the Council, Dr. Erling Hansen.

DR. HANSEN: Mr. President and Members of the Academy: The Council has received and approved the reports of the Executive Secretary-Treasurer, the Editor of the TRANSACTIONS, the Council Committees, and joint and standing committees. These reports will be published in the November-December 1960 issue of the TRANSACTIONS.

The Council recommends that the application fee for fellowship in the Academy shall remain at $25.00; the annual dues for Active Fellows, at $25.00; and for Associate Fellows, at $12.50.

Mr. President, I move the adoption of this recommendation.

The motion was seconded by Dr. James Allen and carried.

DR. HANSEN: The Council recommends the following appropriations for the year 1961:

To the Committee on Conservation of Hearing, a sum not to exceed $20,000; $7,500 of this to be earmarked for the Subcommittee on Noise, to be used for educational purposes, and $5,000 to be earmarked for the Subcommittee on Hearing in Children.

To the Committee on Research in Otolaryngology, $2,000 for cash awards.

To the Committee on Standardization of Tonometers, $2,000.

To the American Committee on Optics and Visual Physiology, $200.

To the American Orthoptic Council, $200.

To the National Committee on Research in Ophthalmology and Blindness, $500.

To the International Federation of Ophthalmological Societies for dues, $300.

To the National Society for Medical Research, $1,000.

To salary of a consultant at the Armed Forces Institute of Pathology, $7,000.

To Fellowship in Ocular Pathology at the Armed Forces Institute of Pathology, $600 per month for a 12-month period.

To the Registries of Pathology, $2,500.

Mr. President, I move the adoption of these recommendations.

The motion was seconded by Dr. Harold G. Scheie and carried.

DR. HANSEN: The Council recommends the following appointments as chairmen to the standing and joint committees for the year 1961:

To the Committee on Audio-Visual Education, Dr. Dean M. Lierle.

To the Committee on Conservation of Hearing, Dr. Dean M. Lierle.

To the Committee on Implants and Implant Techniques, Dr. A. D. Ruedemann.

To the Committee on Ophthalmic Pathology, Dr. Michael J. Hogan.

To the Committee on Otolaryngic Pathology, Dr. Paul H. Holinger.

To the Committee on Reconstructive Plastic Surgery, Dr. John Marquis Converse and Dr. Wendell L. Hughes, Co-Chairmen.

To the Committee on Research in Otolaryngology, Dr. Gunnar Proud.

To the Committee on Scientific Exhibit, Dr. Kenneth L. Roper, Chairman; Dr. Eugene L. Derlacki, Co-Chairman.

To the Committee on Standardization of Tonometers, Dr. Elmer J. Ballintine.

To the Teachers' Section, Dr. A. D. Ruedemann, Chairman, and Dr. John A. Kirchner, Co-Chairman.

Mr. President, I move the adoption of these recommendations.

The motion was seconded by Dr. James Allen and carried.

DR. HANSEN: The Council recommends that no representatives be appointed to the Joint Committee on Eye Banks. It further recommends that a standing committee of the Academy be formed, to be known as the Committee on Eye Banks; that Dr. R. Townley Paton be appointed chairman of the Committee and Dr. John Harry King, Secretary; and that an appropriation of $500 be made to cover the expenses of the Committee.

Mr. President, I move the adoption of this recommendation.

The motion was seconded by Dr. Lawrence R. Boies and carried.

DR. HANSEN: The Council recommends the formation of a Committee on Head and Neck Surgery, with Dr. George A. Sisson as chairman.

Mr. President, I move the adoption of this recommendation.

The motion was seconded by Dr. Boies and carried.

DR. HANSEN: The Council recommends that the Committee on Use of Diagnostic Procedures and Therapy in Uveitis be discharged with thanks.

Mr. President, I move the adoption of this recommendation.

The motion was seconded by Dr. Roper and carried.

DR. HANSEN: The Council further recommends the following appointments as representatives of the Academy to:

American Association for the Advancement of Science, Dr. M. Elliott Randolph.

American Board of Ophthalmology, Dr. Phinizy Calhoun, Jr., for a 4-year term beginning January 1961.

American Board of Otolaryngology, Dr. Francis E. LeJeune and George F. Reed.

American College of Surgeons, Board of Governors, Dr. LeRoy Schall, Dr. George A. Sisson, and Dr. James A. Moore—these names to be submitted for consideration by the American College of Surgeons and one selected by them for the term ending in 1964.

American Committee on Optics and Visual Physiology, Dr. Goodwin Breinin for a term of three years beginning January 1961.

American Orthoptic Council, Dr. John W. Henderson for a term of three years beginning January 1961.

American Standards Association, Acoustical Standards Board, Dr. Edmund P. Fowler, Jr.

American Standards Association, Committee for Standardization of Ophthalmic Lenses, Dr. Carl J. Rudolph and Dr. Arthur C. Linksz.

Institute for Advancement of Medical Communication, Council on Medical Television, Dr. William L. Benedict.

International Organization Against Trachoma, Dr. Phillips Thygeson.

National Committee on Research in Ophthalmology and Blindness, Dr. Bernard Becker and Dr. A. Edward Maumenee.

National Congress of Parents and Teachers, Dr. Frank D. Costenbader.

National Society for Crippled Children and Adults, Inc., Dr. Dean M. Lierle.

Mr. President, I move the acceptance of these recommendations.

The motion was seconded by Dr. Scheie and carried.

DR. HANSEN: The Council recommends the nomination of Dr. William L. Benedict as Editor-in-Chief of the TRANSACTIONS.

Mr. President, I move approval of this recommendation.

The motion was seconded by Dr. Ruedemann and carried.

DR. HANSEN: The Council nominates for Associate Fellowship, Dr. Ted Suie of Ohio State University and Dr. Juergen Tonndorf of the University of Iowa.

Mr. President, I move that we accept the nominations of the Council.

The motion was seconded by Dr. Glen Gibson and carried.

DR. HANSEN: The Council nominates for Honorary Fellowship, Dr. Joaquin Barraquer, Barcelona, Spain, and Dr. Jesus Rhode, Caracas, Venezuela.

Mr. President, I move that we accept the nominations of the Council.

The motion was seconded by Dr. Boies and carried.

DR. HANSEN: The Council nominates for Active Fellowship, 232 candidates who have completed all the requirements for membership.

Mr. President, I move that we accept the nominations of the Council.

The motion was seconded by Dr. Allen and carried.

NEWLY ELECTED FELLOWS OF THE ACADEMY

Alderman, George Carl, 1201 N. Calvert St., Baltimore 1, Md., ALR

Allain, James John, 902 E. Edmond St., St. Joseph, Mo., OP

Allen, George Whitaker, 303 E. Chicago Ave., Chicago 11, Ill., ALR

Anhalt, Edward F., 713 Columbia St., New Westminster, B. C., Canada, OP

Anison, George C., 33 Medical Arts Sq. N.E., Albuquerque, N. M., ALR

Appleton, Budd, U. S. Army Hospital, Fort Hood, Texas, OP

Archer, Dewey Dale, 1901 Oak Park Blvd., Lake Charles, La., OP

Aronberg, Charles, 6360 Wilshire Blvd., Los Angeles 48, Calif., OP

Bade, Craig Perkins, 2006 N. Navarro, Victoria, Texas, OP

Bailey, Arby Lee, 98 Clinton St., Greenville, Pa., OP

Bailey, Norman Loudon, 215 Hammond Bldg., Moose Jaw, Sask., Canada, OP

Bailey, Paul Francis, Jr., 1216 S.W. Yamhill St., Portland 5, Ore., OP

Barber, Hugh Otter, 170 St. George St., Toronto 5, Ont., Canada, ALR

Barron, Stewart S., 4020 Junius St., Dallas 10, Texas, OP

Becker, Barton Robert, 1521 S. King St., Honolulu 14, Hawaii, ALR

Becker, Stanley Clifford, 3720 Washington Blvd., St. Louis 8, Mo., OP

Berard, William Peter, 1509 Medical Dental Bldg., Seattle 1, Wash., ALR

Berger, Ben, 1541 W. Broadway, Vancouver 9, B. C., Canada, OP

Binion, Warren Whiteley, 1201 W. Presidio St., Fort Worth 3, Texas, OP

Bivins, Thomas E., 1209 Park Ave., San Jose 26, Calif., OP

Blum, Fred G., Jr., 110 E. Main St., Madison 3, Wis., OP

Boomer, Robert Bruce, 850 Middlefield Rd., Palo Alto, Calif., OP

Borkenhagen, Robert Herbert, 13000 S. Maple Ave., Blue Island, Ill., ALR

Boyd, Herschell Hood, 26 103rd Ave. N.E., Bellevue, Wash., OP

Brandow, Edward Carpenter, Jr., 678 Madison Ave., Albany, N. Y., ALR

Brown, David V. L., 122 S. Michigan Ave., Chicago 3, Ill., OP

Brugge, Eugene Homer, 426 17th St., Oakland 12, Calif., OP

Buckwald, Albert I., 666 E. Santa Clara St., San Jose 12, Calif., ALR

Burhans, John Burton, 418 Medical Arts Bldg., Grand Rapids 2, Mich., OP

Burton, Robert Dale, 300 Homer Ave., Palo Alto, Calif., ALR

Bussey, Joe Leverett, 1201 W. Presidio, Fort Worth 3, Texas, OP

Byer, Norman Eugene, 21320 Hawthorne Blvd., Torrance, Calif., OP

Campbell, Francis Patrick, New York University Medical Center, New York, N. Y., OP

Carlson, Albert Eugene, 925 W. Ninth Ave., Albany, Ore., OP

Cassady, John Rue, 921 Lincolnway E., South Bend 18, Ind., OP

Chulavachana, Tavisak, Mahachai Rd., Bangkok, Thailand, OP

Cipcic, Joseph Anthony, Fourth Floor, Mercy Hospital, Pittsburgh 19, Pa., ALR

Clark, James Robertson, 34 N. Ash St., Ventura, Calif., ALR

Cole, Roger W., 1718 Hampton St., Columbia 1, S. C., OP

Cook, Thomas William, Jr., 2300 N. Rockton Ave., Rockford, Ill., OP

Cowan, Robert F., 279 Woolwich St., Guelph, Ont., Canada, OP

Cowger, Robert C., 202 N.W. Cedar, Beaverton, Ore., OP

Csovanyos, Laszlo, 198 East Ave., East Norwalk, Conn., ALR

Curtin, Victor Thomas, 1700 N.W. Tenth Ave., Miami 36, Fla., OP

Cutino, Rudolph Lewis, 155 Henry St., Brooklyn 1, N. Y., OP

Davis, Albert James, 2100 Ninth St. South, St. Petersburg 5, Fla., ALR

DeGolia, Pershing, 858 Fourth St., Santa Rosa, Calif., OP

de Juan, Eugene, 1006 Merchants Nat'l Bank Bldg., Mobile, Ala., OP

Dellaporta, Angelos, 2000 Van Ness Ave., San Francisco 9, Calif., OP

Demming, James Henry, 100 Broadway, Daytona Beach, Fla., OP

Depp, Donald Samuel, 305 Royal Hawaiian Ave., Honolulu 15, Hawaii, OP

Dinsdale, Howard Arthur, 852 Lowry Medical Arts Bldg., St. Paul 2, Minn., OP

Draheim, Jerry W., 1838 Parkwood Ave., Toledo 2, Ohio, OP

Drews, Robert Carrel, U. S. Naval Hospital, Great Lakes, Ill., OP

Ehrenreich, Jack, 299 Alhambra Circle, Coral Gables 34, Fla., ALR

Eisenberg, Isadore Jack, 1520 N. Second St., Harrisburg, Pa., OP

Enrile-Tolentino, Leticia M., New Panaderos St., Sta. Ana, Manila, Philippines, OP

Espiritu, Romeo B., Philippines General Hospital, Manila, Philippines, OP

Evans, David J., 1629 Truxtun Ave., Bakersfield, Calif., OP

Fajardo, Romeo V., Wills Eye Hospital, Philadelphia 30, Pa., OP

Feria, Quirico A., Jr., 1200 Misericordia Sta. Cruz, Manila, Philippines, OP

Ferreira, Jose Antonio, H. Irigoyen 384, Cordoba, Argentina, OP

Ferrer, Jose Luis, 6900 W. Belmont Ave., Chicago 34, Ill., ALR

Finley, Ralph Monroe, Jr., 603 Weeks St., New Iberia, La., OP

Fitton, Richard H., Jr., 385 Weetamoe, Fall River, Mass., ALR

Ford, Donald Pierce, 5000 Montrose Blvd., Houston 6, Texas, OP

Ford, James C., 9730 Wilshire Blvd., Beverly Hills, Calif., OP

Fragola, Anthony F., 763 Montauk Highway, West Islip, N. Y., ALR

Frank, Gordon David, 3707 Gaston Ave., Dallas 10, Texas, OP

Freeman, Joseph, 245 S.E. First St., Miami 32, Fla., ALR

Furey, Joseph Aloysius, 309 Blue Bonnet Blvd., San Antonio, Texas, ALR

Galin, Miles A., 525 E. 68th St., New York 21, N. Y., OP

Garrett, Frank E., 510 S. Mathilda, Sunnyvale, Calif., OP

Garrett, Spencer Roberts, 1417 Lakeland Hills Blvd., Lakeland, Fla., OP

Garvey, Edward E., 450 Sutter St., San Francisco 8, Calif., ALR

Gates, Lawrence Keith, 52 N. First East St., Logan, Utah, OP

Gaukrodger, William Thomas, 180 Metcalfe Street, Ottawa 4, Canada, OP

Gazala, Joseph Richard, 1001 W. Franklin St., Richmond 20, Va., OP

Geadah, Fouad Adib, A.B.C. Bldg., Hamra St., Beirut, Lebanon, ALR

Goff, John Robert, Fargo Clinic, Fargo, N. D., OP

Goldsby, Henry Herman, Jr., 1600 Fairfield Ave., Shreveport, La., OP

Gonzalez-Jimenez, Enrique Raul, Padial 38, Caguas, Puerto Rico, OP

Goodner, Ernest Krum, 1500 Fifth Ave., San Francisco 22, Calif., OP

Greiner, Wallace R., 1112 Medical Dental Bldg., Seattle 1, Wash., ALR

Hadlund, Ralph Louis, U. S. Naval Hospital, San Diego 34, Calif., OP

Hall, Dean Morris, 1842 W. Lincoln Ave., Anaheim, Calif., ALR

Hamilton, Ralph Sherrill, 934 Exchange Bldg., Memphis 3, Tenn., OP

Hamrick, George Vincent, 404 Medical Arts Bldg., Charleston 1, W. Va., OP

Harper, Douglas Willis H., 2451A Bloor St., West, Toronto, Ont., Canada, OP

Harper, John Y., Jr., Lackland Air Force Hospital, San Antonio, Texas, OP

Hartstein, Jack, 7165 Delmar Blvd., St. Louis 30, Mo., OP

Hatch, Joseph Lloyd, 465 E. South Temple St., Salt Lake City 11, Utah, OP

Henry, Morriss Murphey, 36th Tactical Hospital, APO 132, New York, N. Y., OP

Herring, Emmett McDonald, Green Clinic, Box 1230, Hattiesburg, Miss., OP

Hildyard, Victor H., 4200 E. Ninth Ave., Denver 20, Colo., ALR

Hill, William R., 28 W. Scribner Ave., Du Bois, Pa., OP

Honan, Paul R., 1720 N. Lebanon St., Lebanon, Ind., OP

Houck, Virgil L., 3007 E. Oakland, Bloomington, Ill., OP

Hudgel, Lawrence Eugene, 237 S. Conwell St., Casper, Wyo., ALR

Hurst, Gerald Winton, U. S. Naval Hospital, Great Lakes, Ill., ALR

James, Burton R., 2900 Fresno St., Fresno, Calif., OP

Jamison, William Arthur, 76 Branch Ave., Red Bank, N. J., ALR

Jayapathy, B., University Hospitals, Iowa City, Iowa, ALR

Jester, Royal F., Jr., 214 W. 25th St., Kearney, Neb., OP

Johnson, Tom Lamar, 406 American Nat'l Bank Bldg., Shawnee, Okla., OP

Jones, Earl Rivers, 161 W. Cheves St., Florence, S. C., ALR

Kalmon, Morris, 159 S. Main St., Akron 8, Ohio, ALR

Karp, Harrison Myron, 1593 Rugby Rd., Schenectady 8, N. Y., ALR

Kasner, David, Apt. 8, 2794 S.W. 30th Ave., Miami 33, Fla., OP

Keays, Claude Fraser, 324 Spring Garden Rd., Halifax, N. S., Canada, OP

Keefe, Robert Joseph, 2345 Ocean Ave., San Francisco 27, Calif., OP

Kern, Arthur Stephen, U. S. Naval Hospital, Corpus Christi, Texas, OP

Khoury, Assad S., Washington Clinic, Wisconsin at Western Ave. N.W., Washington 15, D. C., ALR

Kinosian, Henry John, 323 Washington St., Ogdensburg, N. Y., OP

Kodros, Andreas George, 30 N. Michigan Ave., Chicago 2, Ill., ALR

Kohler, Henry Julius, 5118 N. Broad St., Philadelphia 41, Pa., OP

Kohtiao, Augusto Genato, 344 W. 72nd St., New York 23, N. Y., OP

Kremery, Emil, 6005 W. Cermak Rd., Cicero 50, Ill., ALR

Kupfer, Carl, 243 Charles St., Boston 14, Mass., OP

Land, James Franklin, 110 E. Main St., Madison 3, Wis., ALR

Lang, Robert Muir, Russell Eve Bldg., Hamilton, Bermuda, ALR

LaPointe, Gaston A., 627 E. Jacques Cartier, Chicoutimi, Que., Canada, OP

Lawrence, Van Lloyd, 907 Hermann Professional Bldg., Houston 35, Texas, ALR

Levieff, Leo, 2875 Main St., Stratford, Conn., OP

Liddicoat, Douglas Arthur, 408 E. Lake, Watsonville, Calif., OP

Little, James Graham, Montreal General Hospital, 1650 Cedar Ave., Montreal 25, Que., Canada, OP

Livant, Saul, U. S. Veterans Administration, 35 Ryerson St., New York, N. Y., OP

Lowe, Percy Elliott, 1616 Memorial Professional Bldg., Houston 2, Texas, OP

Lubeck, Marvin Jay, Box 20, William Beaumont Army Hospital, El Paso, Texas, OP

Lundblad, Robert M., 307 S. 12th Ave., Yakima, Wash., OP

Lyon, Ernst F., 133 E. 58th St., New York 22, N. Y., OP

Lyons, George Dewey, 336 N. Jefferson Davis Blvd., New Orleans 19, La., ALR

MacLean, Robert George, 246 W. Main St., Los Gatos, Calif., ALR

Magee, George Franklin, 15 E. First St., Reno, Nev., OP

Manieri, Frank Vincent, 6002 Eastern Ave., Baltimore 24, Md., ALR

Marandi, Kazem Ahmadi, 15 E. Biddle St., Baltimore 2, Md., ALR

Martin, Berkeley Hancock, Jr., 1805 Monument Ave., Richmond 20, Va., OP

Martin, Howard Franklin, A-7 Medical Plaza, 1101 Welch Rd., Palo Alto, Calif., ALR

Mastman, Gary J., 3415th USAF Hospital, Lowry AFB, Denver, Colo., OP

May, William, Winnipeg Clinic, Winnipeg, Man., Canada, OP

Mazer, Irwin Henry, Room 102, Osborne Medical Bldg., Winnipeg 1, Man., Canada, ALR

McCabe, Brian Francis, University Hospital, Ann Arbor, Mich., ALR

McCarthy, James L., 6429 W. North Ave., Oak Park, Ill., OP

McClelland, Randall John, 1124 Broadway, Quincy, Ill., OP

McDonald, George, 17 E. 72nd St., New York 21, N. Y., OP

Miller, William Wright, 490 Post St., San Francisco 2, Calif., OP

Minor, Ralph Hugh, 1515 Pacific, Everett, Wash., OP

Monroe, Charles A., USPHS Hospital, Galveston, Texas, OP

Morledge, Charles Calvin, 310 Hart-Albin Bldg., Billings, Mont., OP

Nachman, Elias, 303 S. Main, Bluffton, Ind., OP

Nager, George T., The Johns Hopkins Hospital, Baltimore 5, Md., ALR

Nail, Benjamin Miles, Jr., 1002 Medical Towers, Houston 25, Texas, ALR

Nassif, Ramzy Iskandar, Dept. of Otolaryngology, University Hospitals, Iowa City, Iowa, ALR

Odeh-Nasrala, Nicolas, Edif. Capitalizadora 201, Tegucigalpa, D. C., Honduras, C. A., OP

Ostiguy, Marcel, 3707 Saint Hubert St., Montreal, Que., Canada, ALR

Palpal-latoc, Leonarda A., San Ildefonso, Ilocos Sur., Philippines, OP

Peabody, Sherman Milne, U. S. Naval Hospital 926, FPO, San Francisco, Calif., OP

Pearlstone, Arnold David, Navy 115, Box 36, FPO, New York, N. Y., OP

Peterson, Walter C., 1601 16th Ave., Seattle 22, Wash., OP

Pifer, William H., 19 N. Washington St., Winchester, Va., ALR

Plowman, Edward Morris, 711 Grand Ave., Hannibal, Mo., ALR

Portenar, Myron Anthony, 419 First St., Lakewood, N. J., OP

Pougiales, Mary Lomas Price, 915 Third Ave. S.E., Rochester, Minn., OP

Preston, Frank R., U. S. Navy Hospital, Camp Pendleton, Oceanside, Calif., OP

Proffitt, Jonas A., Medical Center, 704 W. Koenig, Grand Island, Neb., OP

Pryor, Chester Cornelius II, Womack Army Hospital, Fort Bragg, N. C., OP

Rayfield, Roy Clifton, 75th Station Hospital, Bad Cannstatt, APO 154, New York, N. Y., OP

Relihan, Donald A., 1014 Central Bldg., Wichita 2, Kan., OP

Rex, Eugene Braiden, 102 Lankenau Medical Bldg., Philadelphia 31, Pa., ALR

Riley, Bennet J., 2598 East St., Concord, Calif., OP

Robinson, Stanley T., 228 Meridian Rd., San Jose, Calif., OP

Rosenbaum, Joseph George, 2460 Fairmount Blvd., Cleveland Heights 6, Ohio, OP

Rosenbluth, Joseph Carl, Second Field Hospital, APO 407, New York, N. Y., OP

Rowell, Peter Paul, 201 Livesley Bldg., Salem, Ore., OP

Sabri, Joseph Aziz, 1780 Massachusetts Ave, Washington 6, D. C., ALR

Sanders, Harmon U., 10901 Winner Rd., Independence, Mo., OP

Santos, Milagros T., Malabon, Rizal, Philippines, ALR

Sarin, Lov K., Wills Eye Hospital, Philadelphia 30, Pa., OP

Sawyer, Thomas Rarick, 1211 21st Ave., Nashville, Tenn., OP

Schulz, Kurt Johannes, 4655 Broadway, Gary, Ind., OP

Sciarra, Paschal A., 1011 N. Eighth St., Sheboygan, Wis., ALR

Scott, John Kimball, 110 E. Main St., Madison 3, Wis., ALR

Seeger, Joseph Gregory, USAF Hospital Tachikawa, APO 323, San Francisco, Calif., OP

Shane, Arthur Gerald, 52 Quinpool Rd., Halifax, N. S., Canada, ALR

Shapiro, Lawrence Allen, U. S. Naval Base Hospital, Charleston, S. C., ALR

Shimo-Takahara, George, 3448 Peel St., Montreal, Que., Canada, ALR

Shoff, Mahlon James, Alaska Native Service Hospital, Anchorage, Alaska, OP

Simel, Paul J., EENT Clinic, U. S. Army Hospital, Fort Sill, Okla., OP

Simpson, Derek Grey, 925 W. Georgia St., Vancouver 1, B. C., Canada, OP

Singer, Robert Louis, 2000 Peralta Blvd., Fremont, Calif., OP

Singleton, George Terrell, 12813 South Lowe, Chicago 28, Ill., ALR

Siribodhi, Chira, 4618 Cedar Ave., Philadelphia 43, Pa., ALR

Smart, Don M., 9323 Garland Rd., Dallas 18, Texas, OP

Smersh, Thomas C., 1120 Cherry, Seattle 4, Wash., ALR

Smith, Cody Lane, 125 Prescott, El Cajon, Calif., OP

Smith, William B., 239 Pipestone St., Benton Harbor, Mich., ALR

Snell, George Ernest Douglas, 176 St. George St., Toronto 5, Ont., Canada, ALR

Sobieski, Emanuel John, 408 16th Ave., San Francisco 18, Calif., ALR

Soll, David Benjamin, USPHS Hospital, Seattle 14, Wash., OP

Sorenson, Roger William, Box 170, Valley Forge General Hospital, Phoenixville, Pa., OP

Stealey, Robert Lynn, 1938 Del Monte Dr., Findlay, Ohio, OP

Stern, Charles, Medical Arts Bldg., Natchez, Miss., OP

Sternstein, Herman Jerome, 54 Winter St., Norwood, Mass., ALR

Stevenson, Edward Ward, 1121 Somerville Rd. S.E., Decatur, Ala., ALR

Stewart, C. Thomas, Suite 1559 Medical Dental Bldg., Seattle 1, Wash., OP

Stothers, Hilton Hedley, 140 E. 54th St., New York 22, N. Y., ALR

Stroud, Malcolm Herbert, 640 S. Kingshighway, St. Louis 10, Mo., ALR

Sweebe, Edward Chiles, 243 Charles St., Boston 14, Mass., OP

Sykes, John H. J., 414 Navarro St., San Antonio 5, Texas, OP

Tashma, Albert, 1200 N. Vermont Ave., Los Angeles 29, Calif., OP

Thompson, Hardy Evans, Jr., 706 W. 19th St., Austin 1, Texas, OP

Tipshus, Alfons Fabian, 645 W. Harding Way, Stockton 4, Calif., OP

Tripp, Richard Carlton, 1712 Central Ave., Fort Dodge, Iowa, ALR

Ural, Ibrahim Tali, Asagi Haman Mahallesi No. 7, Divrigi-Sivas, Turkey, ALR

Uribe, Luis Enrique, 9 E. 91st St., New York 28, N. Y., OP

Utens, Max, 10092 Chapman Ave., Garden Grove, Calif., OP

van Fossen, Albert Wayne, 700 Bryden Rd., Columbus 15, Ohio, OP

Vincent, Bayard R., 1202 Delaware Ave., Wilmington, Del., OP

Watson, John R., 1133 Punchbowl St., Honolulu 13, Hawaii, ALR

Weatherall, Richard Hooper, USAF Hospital Wiesbaden, Box 330, APO 633, New York, N. Y., OP

Weimer, John Russell, Suite 202, 800 Pershing Dr., Silver Spring, Md., OP

White, Melvin Jeffrey, USAF Hospital, MacDill AFB, Tampa, Fla., OP

Wierzbinski, Francis Albert, 1241 N. Broadway, Billings, Mont., ALR

Wiesinger, Herbert, 2015 Monument Ave., Richmond 20, Va., OP

Wilder, William Wiggins, Suite 6, 4623 Poplar Ave., Memphis 17, Tenn., OP

Williams, Albert Harold, 109 Prichard St., Fitchburg, Mass., ALR

Williams, Barney Kenneth, Jr., Peterson Memorial Hospital, Kerrville, Texas, OP

Williams, Neil S., 1702 13th St. South, Fargo, N. D., OP

Wladecki, William B., 100 E. Broad St., Elyria, Ohio, ALR

Wootton, James Chipman, USAF Hospital, Maxwell AFB, Ala., OP

Wuerschmidt, Marcus Aurelius, 43 E. Bridge St., Oswego, N. Y., OP

Zauderer, Seymour J., 44 Gramercy Park North, New York 10, N. Y., ALR

DR. HANSEN: The Council nominates the following officers for the year 1961:

President: Dr. Dohrmann K. Pischel, San Francisco

President-Elect: Dr. Lawrence R. Boies, Minneapolis

First Vice-President: Dr. Frederick T. Hill, Waterville, Maine

Second Vice-President: Dr. Maynard Wheeler, New York

Third Vice-President: Dr. Leland Hunnicutt, Pasadena

Councillor: Dr. Michael J. Hogan, San Francisco

Executive Secretary-Treasurer: Dr. William L. Benedict, Rochester, Minnesota

Secretary for Ophthalmology: Dr. Kenneth L. Roper, Chicago.

Secretary for Otolaryngology: Dr. Clair M. Kos, Iowa City

Secretary for Instruction in Ophthalmology: Dr. A. D. Ruedemann

Secretary for Instruction in Otolaryngology and Maxillofacial Surgery: Dr. Eugene L. Derlacki, Chicago

Secretary for Home Study Courses: Dr. Dean M. Lierle, Iowa City

Secretary for Public Relations: Dr. Glen G. Gibson, Philadelphia

Mr. President, I move the adoption of these nominations.

PRESIDENT LIERLE: Do I hear any other nominations? If not, the nominations are closed.

Dr. Allen moved that the nominations be closed and that a unanimous ballot be cast for the slate of the Council. The motion was seconded by Dr. Kos and carried.

DR. HANSEN: The Council has designated the time and place of the next scientific session of the Academy as October 8 to 13, 1961, Palmer House, Chicago.

A Council-appointed committee has drafted a communication to the Advisory Board of Medical Specialties, a copy of which will be sent to secretaries of the member specialty boards:

Dr. L. A. Buie, M.D.
Advisory Board of Medical Specialties
Kahler Hotel
Rochester, Minnesota

Dear Doctor Buie:

A very unfortunate article appearing in *Harper's Bazaar* June 1960, as well as others which preceded and followed it in several different lay publications, was brought to the attention of the Council of the American Academy of Ophthalmology and Otolaryngology at its Annual Meeting in Chicago, October 8, 1960.

The Council was disturbed to learn that these articles belittle the qualifications of some physicians, including diplomates of several different American specialty boards, among which are the two oldest. In reality, the articles utilize certification by a specialty board for the aggrandizement of one group of physicians, even to the point of embarrassment of others.

This Council believes that the entire matter deserves your consideration, and recommends appropriate action.

Respectfully yours,
Executive Secretary-Treasurer

Mr. President, I move the approval of this action.

The motion was seconded by Dr. Allen and carried.

DR. HANSEN: Mr. President, I move the acceptance of the report as a whole.

The motion was seconded by Dr. Clair Kos and carried.

PRESIDENT LIERLE: Is there any new business to come before the Business Meeting?

DR. BENEDICT: There is nothing at this desk.

PRESIDENT LIERLE: Does anyone else have anything to bring up? If not, I would like to introduce our President as of January 1, 1961, Dr. Dohrmann K. Pischel.

DR. PISCHEL: Mr. President and Members: I was overwhelmed by elevation to this high post. In looking over the galaxy of stars who have held this post before, I feel very embarrassed, and I can only hope that with the cooperation of our committee chairmen, our Vice Presidents, and especially our Executive Secretary-Treasurer, next year will measure up to the high standards that have been set in the past. Thank you.

PRESIDENT LIERLE: I know you will have a very successful term.

[The audience arose and applauded.]

PRESIDENT LIERLE: I see Dr. Boies, our next President-Elect, is here. Would you like to say a few words, Dr. Boies?

DR. BOIES: Gentlemen, I feel very honored and also very humble. Thank you. [Applause]

PRESIDENT LIERLE: I want to express my thanks to everyone for making this what I believe has been a very successful meeting. We have had wonderful programs, and I thought the night of diversion and the banquet were wonderful. I assure you I had nothing to do with it. I do want to thank you all for making this such a good meeting.

Will someone move for adjournment?

DR. SCHEIE: I so move.

DR. ALLEN: Second.

The motion was put to a vote and was carried unanimously. The meeting adjourned at 5:50 p.m.

COMMITTEE REPORTS

Upon recommendation by the Activities Committee, the Council voted acceptance of the following reports of the standing and joint committees:

REPORT OF THE COMMITTEE ON AUDIO-VISUAL EDUCATION

DEAN M. LIERLE, Chairman

The motion picture films Embryology of the Eye and Embryology of the Ear are being used in teaching hospitals and medical schools throughout the world. Since the report of the Committee in 1959, five prints of Embryology of the Eye have been made and sent to:

University of Arkansas, Little Rock
American Medical Association, Chicago
Frank B. Snell, Decatur, Illinois
Societas' Filmarki, Göteborg, Sweden
University of Miami School of Medicine, Miami

This brings the total number of prints of the Eye film sold to 78.

Since the report of the Committee in 1959, one print of the Embryology of the Ear film has been made and sent to the American Medical Association, Chicago. This brings the total number of prints of the Ear film sold to 22.

Albums of 196 selected frames from the motion picture Embryology of the Ear have not been well received, and only 22 sets were sold. While they were intended to supplement the use of the film in classrooms, they were not regarded as sufficiently helpful to warrant the cost of production.

No new motion pictures are contemplated by the Committee at this time. Projection of 3-D pictures at the annual meeting in instructional courses and in the Home Study Courses requires special equipment. Filters for screen viewing usually are supplied by the lecturer giving the course that requires them. Self-lit viewers for 2×2 slides are used by two lecturers this year in the instruction courses and will be furnished by the Academy as special equipment. They will be furnished with manuals with mounted 3-D photographs in Brown Farrior's "Tympanoplasty in 3-D."

The Committee has incurred no expense in the past five years and asks for no appropriation. We recommend that the Committee be continued.

REPORT OF THE COMMITTEE ON CONSERVATION OF HEARING

DEAN M. LIERLE, M.D., Chairman

The Executive Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology held a meeting at the Palmer House in Chicago, Illinois, December 13, 1959. All members were present except Doctors House, Rosenblith and Serio. Dr. W. L. Benedict, Secretary-Treasurer of the American Academy of Ophthalmology and Otolaryngology, and Dr. Eldon L. Eagles, Pittsburgh, Pennsylvania, were also present.

The paper entitled "Opportunities for Research and Research Training in the Field of Hearing," presented by Dr. Gordon H. Seger of the National Institute of Neurological Diseases and Blindness, Bethesda, Maryland, at the meeting of the Committee on Conservation of Hearing and Otosclerosis Study Group on Sunday, October 11, 1959, and the paper entitled "Availability of Funds for Research in Otolaryngology" written by Dr. Tonndorf were recommended for publication in the TRANSACTIONS.

An excellent exhibit was presented by the Committee on Exhibits at the last Academy meeting. Several testing booths were set up in conjunction with the exhibit. About five hundred eye, ear, nose and throat doctors were tested but the results were not completely satisfactory, as some of the technicians had not done much audiology. It was advised that the next exhibit include simple pictures on the technique of hearing testing along with information on where to obtain various manuals published by the Committee.

The ten chapters for the manual on Audiometry have been selected, and it is expected that the manual will be completed by the time of the next meeting.

Dr. Glorig, as representative of the Academy, the American Otological Society and the American Standards Association, attended the meeting on International Standards for Audiometry held in Stuttgart, Germany, between August 27 and September 8, 1959. At

that time there was also a meeting of the Committee on Standards for audiometer specifications which he attended. The question of the standard zero reference level for audiometers was discussed at the meeting of the International Organization for Standardization and it was expected that this would be finalized at the meeting to be held in Naples, Italy, in the spring.

Dr. Glorig attended a meeting of the Committee on Public Health Aspects of Hearing Conservation held in Washington, D. C., May 18 and 19, 1959. A report of the results of the conference was published as a supplement in the November-December 1959 issue of the TRANSACTIONS.

As a result of the article on "Dihydrostreptomycin induced Deafness," sponsored by the Committee, an excellent editorial appeared in the New England Journal of Medicine, and Squibb's Laboratory asked permission to purchase and distribute a large number of the articles, and translate it into foreign languages. A resume of the published articles on dihydrostreptomycin deafness was presented at the Annual antibiotics symposium held by the Food and Drug Administration in Washington, D. C., and immediately following the meeting the Director of the Food and Drug Administration Agency announced that a resolution would be passed to prohibit the manufacture and sale of mixtures of penicillin with dihydrostreptomycin.

It was recommended that the intraprofessional relationship between the American Hearing and Speech Association and the Committee on Conservation of Hearing be renewed.

An initial study is being conducted on a population of approximately 4,000 children from 3 to 15 years of age at the University of Pittsburgh by the Subcommittee on Hearing in Children. The relation among otolaryngological examination findings, medical histories, air conduction hearing thresholds, academic achievement, and other aspects of child development is being studied.

An ancillary study is being carried on at the Johns Hopkins Medical Institutions in association with the cerebral palsy study. In this study, randomly selected, stressed children born of primiparous mothers with poor pelvic measurements, Rh negative mothers, women who have had difficulty in carrying their children to term, and women previously giving birth to imperfect children, are followed carefully in the prenatal, natal and postnatal periods as part of the National Cerebral Palsy Study. The interest in them is to determine the number and type of hearing problems occurring in such children, and to evaluate methods for testing very young children.

The Committee on Noise reported that the insurance companies have withdrawn their support, but they have been successful in obtaining grants from the National Institutes of Health. One of the proposals submitted to N.I.H. was a two-survey-type program which deals with another Wisconsin State Fair survey, an exact repetition of the survey made in 1954, and a study on variability in field and clinical audiometry.

The Academy made an allowance of $20,000 to the Committee on Conservation of Hearing. Of this sum $12,500 was allocated to the expense of the general committee, $7,500 to the Subcommittee on Noise for educational purposes, and $5,000 to the Subcommittee on Hearing in Children.

The Manual entitled "A Guide to the Care of Adults with Hearing Loss" prepared by the Committee on Hearing in Adults was approved. The following projects are under consideration by the Committee on Hearing in Adults:

1. The proposal for a simple punch card form to constitute a means of assembling diagnosis of the etiology of hearing loss as these occur in the experience of teaching clinics.
2. The feasibility of a study to obtain factual information on the relationship of hearing loss to driver licensure as a factor in automobile accidents.
3. The study of adult hearing loss comparable in some respects to the one being made on children.

Several audiometers were tested by the Committee on Audiometers and were recommended for listing as of December 15, 1959

A third draft dealing with the technique of temporal bone removal during a autopsy has been prepared by Dr. Lindsay and Dr. Schuknecht and has been published in the TRANSACTIONS of the Academy. Reprints will again be circulated to both pathologists and otolaryngologists. Dr. Lindsay and Dr. Schuknecht were appointed as a subcommittee to approach the N.I.H. for funds for setting up a library of selected temporal bone sections in Washington.

An Employment Registry for Scientists has been established by the American Academy of Ophthalmology and Otolaryngology in order to facilitate the growth of academic ophthalmology and otolaryngology in both clinical and basic science areas in the various medical schools and associated hospitals and institutions of the country. The registry will serve to aid in the placement of candidates completing training who desire academic and investigative positions, and it will also facilitate the replacement of those already in such positions who desire to take a different position.

The Committee appreciates very much the appropriation made by the Council of the American Academy of Ophthalmology and Otolaryngology in support of the work of the Committee on the Conservation of Hearing, and we respectfully request the same amount of $20,000 for 1961.

REPORT OF THE COMMITTEE ON IMPLANTS AND IMPLANT TECHNIQUES

A. D. RUEDEMANN, Chairman

Subcommittees have been assigned to investigate the materials used and methods of making implants. An excellent conference was held in which glass and plastic eye makers took part. It was both interesting and constructive.

REPORT OF THE COMMITTEE ON OPHTHALMIC PATHOLOGY

MICHAEL J. HOGAN, Chairman

The Committee on Ophthalmic Pathology submits the following report of its activities during the past year to the Council of the American Academy of Ophthalmology and Otolaryngology.

I. OPHTHALMIC PATHOLOGY REGISTRY

One thousand seven hundred and four (1704) specimens were contributed to the Registry of Ophthalmic Pathology during 1959. Of these, 981 were whole eyes (740 from civilian contributors). The other 723 cases were sectioned eyes and specimens from the conjunctiva, lids and orbit (305 from civilian contributors). There is now a total of 48,277 accessions in the Registry of Ophthalmic Pathology. On 31 December 1959 the Registry had a total backlog of 391 cases compared with 253 cases on 31 December 1958, an increase of 138 cases.

The Registry loan sets were borrowed by 132 individuals: 14 in the Armed Forces, 5 in the Veterans Administration, 3 in the Public Health Service, and 110 civilians.

TRAINING ACTIVITIES

Personnel in the Ophthalmic Pathology Branch of the Armed Forces Institute of Pathology are engaged in a variety of educational activities which include: (1) participation in formal courses, (2) participation in clinicopathologic conferences and seminars, (3) presentation of special lectures, (4) on-the-job training of residents and fellows, (5) preparation of exhibits, and (6) preparation of microslide and lantern slide loan sets.

1. *Courses*

a. *AFIP's Annual Course in Ophthalmic Pathology*: A course in Ophthalmic Pathology was conducted at the Armed Forces Institute of Pathology, March 9-13. The faculty included Dr. Lorenz Zimmerman, Course Director; Doctors Norman Ashton, Frederick C. Blodi, Victor A. Byrnes, Ben S. Fine, Frank B. Johnson, Sam T. Jones, Don W. Longfellow, Richard M. Lubowitz, A. Edward Maumenee, Thomas R. McKenzie, Benjamin Rones, T. E. Sanders, William H. Spencer, and Bradley R. Straatsma, Miss E. V. Paul, and Mr. L. P. Ambrogi. The enrollment included 84 physicians: 52 from the Armed Forces and other governmental institutions, 22 civilians, and 10 foreign nationals.

b. *Washington Hospital Center's Course on Basic Sciences Applied to Ophthalmology*: Dr. Zimmerman and Dr. Silverstein presented a series of lectures on pathology and immunology, with special emphasis on uveitis, January and February.

c. *New Orleans Academy of Ophthalmology Course on Diseases of the Retina*: Dr. Zimmerman participated with lectures on histology and pathology of the retina and vitreous, February 23-27.

d. *Wilmer Institute Training Program*: Dr. Zimmerman presented a series of lectures on pathologic anatomy of the eye (periodically throughout the entire year).

e. *Dr. Georgiana Theobald's Course*: During the meeting of the American Academy of Ophthalmology and Otolaryngology, Dr. Zimmerman participated as a faculty member in Dr. Theobald's perennial course in ocular pathology.

f. *University of California Course in "Practical Gonio-Anatomy"*: Dr. Zimmerman served as Visiting Professor at the University of California and participated as a faculty member of this course, November 12-13.

g. *Emory University Postgraduate Course in Applied Ophthalmic Pathology*: Dr. Zimmerman participated with lectures on granulomatous uveitis, fungus infections of the eye and lacrimal gland tumors.

2. *Clinicopathologic Conferences and Seminars*

a. Dr. Zimmerman conducted a seminar on ocular pathology for the Ohio State Society of Pathologists at Columbus, Ohio, January 17.

b. Dr. Zimmerman assisted Dr. M. Parks in presenting a clinicopathologic conference on Retinoblastoma at the Children's Hospital, Washington, D. C., January 21.

c. Dr. Zimmerman participated in the Fourth Glaucoma Conference sponsored by the Josiah Macy, Jr., Foundation, Princeton, New Jersey, March 8-10.

d. Dr. Zimmerman participated in the Thirteenth Annual Meeting of the Ophthalmic Pathology Club, held at the AFIP, March 16-18.

3. *Other Lectures*

a. Dr. Zimmerman served as Visiting Professor at Ohio State University and lectured there on "Lacrimal Gland Tumors," January 16.

b. Dr. Zimmerman was the guest speaker at the New England Ophthalmological Society meeting on February 18; his subject was "The Pathology and Prognosis of Epithelial Tumors of the Lacrimal Gland with Comments on Management."

c. Dr. Zimmerman was the guest speaker at the Houston Ophthalmological Society, April 8; his subject was "Pathology of Granulomatous Inflammations of the Eye."

d. Dr. Zimmerman presented the McReynolds Lecture at the University of Texas, Medical Branch, Galveston, April 9; his topic was "Pathologic Anatomy of Blindness."

e. Dr. Zimmerman served as Visiting Professor, University of California at Los Angeles, and lectured on "The Pathology of Granulomatous Inflammations of the Eye," April 13.

f. Dr. Zimmerman delivered the XXII George B. de Schweinitz Lecture before the Section on Ophthalmology of The College of Physicians of Philadelphia, November 19; his subject was "Melanotic Tumors of the Optic Nerve Head."

g. Dr. Zimmerman was guest speaker at the annual meeting of the Atlanta Ear, Eye, Nose and Throat Society, December 2, speaking on "Melanotic Tumors of the Optic Nerve Head."

4. *On-The-Job Training*

The following ophthalmologists received on-the-job training and experience in ophthalmic pathology at the AFIP:

a. Capt. D. W. Longfellow completed one year of training in Ophthalmic Pathology, as U. S. Army Fellow.

b. Lt. Col. C. O. Rixey completed six months of training as U. S. Army Fellow in Ophthalmic Pathology.

c. Dr. Ben S. Fine was awarded a Public Health Service Traineeship for application of biophysical methods to study ocular histology and pathology (PHS Traineeship No. BT-502).

d. Dr. Harold I. Rodman began a Postdoctoral Fellowship for training in histochemistry and ophthalmic pathology (PHS Fellowship No. BF-10, 593).

e. Dr. T. R. McKenzie completed a one-year fellowship, sponsored by the American Academy of Ophthalmology and Otolaryngology.

f. Dr. Milton Boniuk began a one year Fellowship, sponsored by the American Academy of Ophthalmology and Otolaryngology.

g. Dr. Victor Curtin completed three months of training, sponsored by the National Institute of Neurological Diseases and Blindness.

h. Dr. William Spencer completed nine months of training, sponsored by the Heed Foundation.

i. Dr. R. M. Lubowitz completed three months of training, sponsored by the Heed Foundation.

j. Capt. Budd Appleton, U. S. Army, completed three months of training in ophthalmic pathology.

k. Drs. H. Morris, R. Yudell, M. Radulovic, M. Kwitko and S. Elias began or completed periods of four to six months of training in Ophthalmic Pathology as part of their Washington Hospital Center Residency in Ophthalmology.

l. Dr. J. W. Rout completed four months of training in Ophthalmic Pathology as part of his residency in ophthalmology at Howard University.

5. *Exhibits*

a. Mr. L. P. Ambrogi presented his prize-winning exhibit on "Processing Whole Eyes in Paraffin" on a closed-circuit medical television broadcast, September 8.

b. An exhibit on "Clinicopathologic Study of the Cornea", prepared at the AFIP by Drs. L. E. Zimmerman, W. F. Hughes, and S. T. Jones, received Third Award at the annual meeting of the American Academy of Ophthalmology and Otolaryngology in October.

RESEARCH ACTIVITIES

Experimental Studies

a. With the financial support provided by a grant from the Council for Research in Glaucoma and Allied Diseases, Alfred P. Sloan Foundation, Inc., Drs. A. Silverstein and L. E. Zimmerman have pursued their studies of immunogenic uveitis. In addition to the published reports listed below, a paper on "Clinical and Histopathologic Observations on Experimental Hypersensitivity" was presented at the Wilmer meeting, March 19.

b. Drs. B. S. Fine and L. E. Zimmerman have continued their studies of mycotic infections of the eye aided, in part, by a Fight for Sight Award of the National Council to Combat Blindness, Inc.

c. Mr. A. J. Tousimis and Dr. B. S. Fine have initiated an intensive study of the ultrastructure of the iris and vitreous using biophysical methods, including electron microscopy. Progress in this area will be accelerated with the transfer of Mr. Tousimis from the Biophysics Branch to the Ophthalmic Pathology Branch on August 20, 1959.

d. Drs. H. I. Rodman and L. E. Zimmerman initiated histochemical studies of asteroid bodies in the vitreous.

STAFF

As of 31 December 1959, the regular AFIP Staff personnel in the Ophthalmic Pathology Branch consisted of:

L. E. Zimmerman, M.D., Branch Chief and Registrar, Registry of Ophthalmic Pathology

E. V. Paul, Medical Histologist and Assistant to the Branch Chief

A. J. Tousimis, Biophysicist

G. R. Lewins, Secretary

F. Coles, Clerk-Typist

II. OPHTHALMIC PATHOLOGY ATLAS

Copy was received by the principal contributors during the summer of 1959. At the 1959 Academy meeting, a part of this material was discussed with the authors, and appropriate changes were made.

The contributed material was edited in San Francisco during October and November 1959 by Drs. Hogan and Zimmerman. This proved to be a large task, and many chapters were extensively revised. For this reason a letter vote was taken and the contributors agreed to not have their names at the head of each chapter; contributors are to be listed in the frontispiece as principal contributors.

This revision is so changed from the first edition that many new illustrations are required. For this reason, Saunders has complete copy and illustrations on Chapter I through V. The copy is close to final on the other eight chapters, which do not need as many new illustrations.

A mock-up copy will be shown at Saunders' booth during the coming meeting. The book should be ready for distribution early in 1961.

The committee wishes to thank the Council for their strong support and financial assistance in the preparation of this book.

III. OPHTHALMIC PATHOLOGY LABORATORIES

No communications have been received from eye departments or laboratories during the year with respect to lack of facilities.

A communication from Dr. S. Ry Andersen at the Rigshospitalets in Copenhagen is to the effect that his university now is supporting a separate eye pathology laboratory in the general pathology department. His is the only eye pathology laboratory in Scandanavia.

IV. TEACHING MANUAL

This manual suffered from lack of attention during preparation of the eye atlas. Dr. William H. Spencer and Dr. Hogan probably will be able to complete the text during the coming year.

REPORT OF COMMITTEE ON OTOLARYNGIC PATHOLOGY

PAUL H. HOLINGER, Chairman

MINUTES OF MEETING, OCTOBER 13, 1959

In addition to members of the Committee, the following guests were introduced: William L. Benedict, M.D., Executive Secretary-Treasurer, American Academy of Ophthalmology and Otolaryngology; Joe M. Blumberg, Colonel, M.C., U.S.A., Deputy Director of AFIP and Scientific Director, American Registry of Pathology; Samuel H. Rosen, M.D., Registrar, Registry of Otolaryngic Pathology, AFIP; Francis L. Lederer, M.D., Professor of Otolaryngology and Head of the Department of Otolaryngology, University of Illinois, College of Medicine; George Keleman, M.D., Research Associate, Department of Otolaryngology, Harvard University, Boston.

I. Dr. Blumberg was asked to inform the Committee of the status of the organization and activties of the American Registry of Pathology, their place in American Medicine, and what is required to ensure their continuance in the future. Dr. Blumberg described the organization of the AFIP, which is composed of four major professional departments: the Department of Pathology, the Medical Museum, the Medical Illustration Service, and the American Registry of Pathology. At the request of the Chairman, his remarks concerning the Registry were submitted in writing in order that they could be included in the minutes of this meeting. They are as follows:

"The American Registry of Pathology, sponsored by the National Research Council, is operated by the Armed Forces Institute of Pathology as a cooperative enterprise in medical research and education between the Armed Forces Institute of Pathology and the civilian medical profession, under the direction of the Board of Governors and the National Research Council. In general, its objective is the utilization of pathological material in the acquisition and dissemination of knowledge in the field of pathology. The Registry is housed and supported at the Armed Forces Institute of Pathology. All funds are collected, controlled and disbursed by the National Academy of Sciences.

"The American Registry of Pathology consists of twenty-five individual registries, each dealing with one field of pathology and sponsored by a National Medical, Dental or Veterinary Society. The individual registrar is, in each case, the chief of that particular section of the AFIP.

"Research is largely, but not exclusively, directed toward, (a) statistical analysis and (b) clinico-pathological correlation, particularly with reference to natural history of disease, including various therapeutic influences.

"Education, constitutes a large proportion of the work and, in this area can be described by the following activities:

(a) Each year approximately 12,000 well documented cases with pertinent material and data are registered (indexed and filed). At the present time, approximately 170,000 selected cases are available for study by qualified persons visiting the AFIP, as well as serving for study and analysis by members of the staff. This material is selected from two sources. Cases from military and Veterans Administration sources pass through the AFIP sections of the respective registrars, who select and register cases suitable for educational purposes. Similarly civilian pathologists contribute suitable cases, which also are reviewed by the interested section of AFIP. Since this review is reported to the contributor, he gets the benefit of an AFIP consultation.

(b) In addition to being available for use by qualified visitors, the material in the American Registry of Pathology is used for the preparation of many scientific papers and special studies by members of the staff.

(c) Through the administration of the American Registry of Pathology, various na-

tional societies sponsor fellowships at the AFIP in many fields.

(d) Similarly, many research projects and special studies are sponsored at the AFIP by different societies and agencies. These records and accounts are kept by the Registry.

(e) Many atlases, syllabuses, and manuals are prepared and distributed, both permanently and on a loan basis. Annually, about 30,000 publications are distributed, perhaps the best known being fascicles of the "Atlas of Tumor Pathology."

(f) Different medical groups depend on the ARP for preparation of material for seminars and courses. Annually about 40,000 microscopic slides are prepared for such meetings.

(g) Much teaching material is prepared, maintained and loaned by the ARP. As an average, each year 40,000 microscopic slides, 30 complete clinical pathological conference sets, 12 lantern slide sets of Radiologic Pathology are prepared and loans of 5,000 microscopic slide study sets and 125 complete clinical pathological conference sets are made.

"These many activities are carried on with a high degree of efficiency and economy. The total annual budget representing a total slightly in excess of one hundred thousand dollars, exclusive of the many research grants administered by the American Registry of Pathology."

In addition, Dr. Blumberg pointed out that the American Registry of Pathology has an operative annual budget, exclusive of the military, of $109,000. However, when this is broken down into its three components, the seminar operation shows neither profit nor loss. Likewise, the publication operation makes each of these a nonprofit aspect of registry operations. In the general registry operations, the total income is $37,000; $24,000 comes from the Veterans Administration and, after deduction of the royalties and investment income, the seventeen sponsoring societies for the twenty-five registries contributed last fiscal year, $11,750. He further pointed out that nine of the sponsoring societies contributed no money, of which the Academy was one, while eight societies contributed this amount. In order to meet the requirements of the Registry in the immediate future, Dr. Blumberg stated that the token amount from the sponsoring societies may be whatever they deem that they can afford. As a beginning, it is hoped to show $3,000 to $5,000 or even more. This is really not a great deal when one considers that ten years ago $2,500 was contributed. The principal point that Dr. Blumberg wished brought to the Council of the American Academy of Ophthalmology and Otolaryngology is that they should contribute to the supporting "community fund" of the American Registry of Pathology without which the many educational activities of the Armed Forces Institute of Pathology could not be carried out. The other point that should also be brought before the council is that the National Academy of Sciences requires a 25 per cent overhead of salaries and wages, so that when money is contributed to the American Registry of Pathology, this should be borne in mind.

Dr. Benedict then reviewed the position of the Academy in regard to the contributions given annually to the Registry but discontinued after 1949. Beginning in that year, special projects sponsored by the Academy and carried out in part through the facilities of the AFIP were considered as indirect support of the AFIP and the Registries. *The Atlases alone were assisted at a cost of approximately a hundred thousand dollars.*

In view of the foregoing discussions and in keeping with the contribution of other similar specialty societies, the committee, on motion duly made, seconded and unanimously carried, recommended to the Council that the Academy return to support the Registry of Otolaryngic Pathology in a manner comparable to its previous support.

The members of the Committee thanked Dr. Blumberg for his informative discussion of the organization and activities of the AFIP and the Registries.

II. Dr. Samuel Rosen, Registrar of Otolaryngic Pathology, gave a resume of his comprehensive report to the Committee and submitted copies of the report to the members. The status of the sale of the Atlas and the preparation of the slide study and teaching sets was reviewed. It was suggested by Dr. Senturia that a copy of the Atlas be sent with each loan set of microslides with a high probability that the book would be purchased. Dr. Senturia, Dr. Benedict and Dr. Rosen agreed to investigate the practicability of such a plan. If it proves impractical, it was felt the value of the loan sets could be enhanced by an accompanying brief clinical abstract of each slide.

The temporal bone study was discussed, and it was apparent that while the Air Force project of processing temporal bones was continuing, the progress was slow. It was felt that much of the value of the material was being lost because of the slow progress of processing. Questions were raised concerning the preservation of the material and means of speeding up this activity. The work of Dr. Lindsay in photographing temporal bone sets on 2 × 2 slides was mentioned and consideration given to utilizing duplicates of these photographs for teaching sets. This would be dependent on how soon the microslides themselves might be available but could be considered as a temporary substitute.

Dr. Rosen gave a statistical report on the Registry of Otolaryngic Pathology and indicated that almost 2,000 cases now in the Registry of Dental and Oral Pathology that fall into categories considered by the Committee last year to be of otolaryngic interest would be entered in the Registry of Otolaryngic Pathology without further review of the diagnosis by the ENT Pathology Branch.

Dr. Rosen then discussed the status of the Residency program in ENT Pathology at the AFIP, mentioning that two requests were received and processed but were disapproved on the ground of existing military policy. One applicant for the Academy Fellowship was approved and acted upon favorably by the Academy but the applicant found it necessary to withdraw the application because of a physical disability that would not permit him to accept this duty.

III. The foregoing discussion introduced the subject of Fellowships in Pathology presented in a letter from Dr. Benedict. The letter, in part, is as follows:

"I have received a letter from Dr. Schall saying that he would be willing to go along with broadening the scope of institutions in which a residency in pathology could be obtained. Dr. Hogan, Chairman of the Eye Pathology Committee is also in favor of broadening the scope of scholarships. So far scholarships have been limited to the AFIP, not as a result of Council action, but presumably the scholarships have been limited to the AFIP because the suggestions that scholarships be established have all come from Directors at the AFIP. I think the matter should be cleared by Council action next October."

From Dr. Benedict's letter, it was quite obvious that a major step could be taken by the Committee in the furtherance of the study of Otolaryngic Pathology. Many institutions, including the AFIP, have facilities for Fellowships, and support by the Academy would facilitate the development of these Fellowships. Dr. Benedict stated that the Educational Fund of the Academy is now legally set up to permit utilization of funds for such fellowships or scholarships. Applications for Pathology Residencies or Fellowships would be acted upon by this Committee. Recommendations by this Committee regarding participating institutions and residency applicants would be submitted to the Council for final action or approval.

The Committee strongly endorsed the concept of broadening the scope of scholarships and recommended such action to the Council.

There being no further business, the meeting adjourned.

REPORT BY REGISTRAR OF REGISTRY OF OTOLARYNGIC PATHOLOGY OCTOBER 1960

I. *Atlas of Otolaryngic Pathology*

At the time of the last annual report, 159 copies of the Atlas of Otolaryngic Pathology remained to be sold by the American Registry of Pathology. These were completely disposed of at $20 per copy between October 1959 and May 1960.

II. *Slide Study and Teaching Sets*

1. These continue to be in far greater use by civilian doctors than by Federal Government employed doctors, the latter including Veterans Administration, Army, Navy, Air Force and Public Health Service doctors. The disproportion is probably in large part simply a reflection of a corresponding disproportion in the numbers of ENT specialists in the two categories.

The breakdown of requests is as follows:

	LARGE ENT SET (NEW) (86 SLIDES)	SMALL ENT SET (OLD) (50 SLIDES)	ASCP 1946 SEMINAR ON SPECIAL SENSES (25 SLIDES)	TOTAL
Civilian	110	18	7	135
Government employed	24	9	7	40
Totals	134	27	14	175

The maximum number of sets on loan at one time was 27.

Additional material is now being processed to bring the new ENT set of 86 slides up to the 100 slides originally planned. The 10 slides of normal histology which are now part of this set will be withdrawn and replaced by slides of pathologic entities. The histology slides withdrawn will then form the nucleus for a set of normal histology slides, material for which is now being collected with the assistance of an ENT resident from the Washington, D. C., Medical Center. The sets being enlarged to 100 slides should become available by the middle of the coming year or sooner.

Pursuant to the consensus of the Committee members expressed at the last meeting, we have undertaken, with the assistance of an ENT resident from the Walter Reed Army Hospital, to prepare brief clinical notes which will accompany the diagnosis of each of the 100 slides in the new enlarged study sets. This, too, should be available for distribution within the coming year provided the clinical data is deemed adequate.

It was further suggested at the last meeting that consideration be given to making available a copy of the Atlas of Otolaryngic Pathology by Ash and Raum with each 100-slide study set out on loan. The Registrar would like at this time to suggest that this Committee consider recommending that the Academy contribute to the Registry 50 copies of the Atlas for use with the study sets on a loan basis. Since it is reasonable to assume that some of those requesting study sets will have their own copies of the Atlas, the circular of information on loan study sets could indicate that a copy of the Atlas of Otolaryngic Pathology by Ash and Raum for use with the study set is available for loan if desired. As was pointed out at the last meeting, another purpose could be served by these loan copies of the Atlas, since an appropriate sticker appended to each volume could indicate that copies of the Atlas are available for purchase from the Academy.

2. It was reported at the last meeting that three loan teaching sets of 2 × 2 lantern slides of ENT histopathology, ENT roentgenograms and ENT clinical and gross pathological photographs had been assembled by Walter Reed Army Hospital ENT residents during their periods of assignment to the AFIP, and that these sets would require extensive editing before they would be satisfactory for release. The required editing, which was begun on the roentgenogram set, has proved to be an even bigger job than was anticipated, so that at present we cannot forsee what the outcome will be.

III. *Temporal Bones*

Since last year's report, three temporal bones belonging to the Air Force project have been serial sectioned and stained at the AFIP. The results, although leaving room for improvement, were fairly satisfactory for an initial undertaking. In addition, two temporal bones were turned over to an Air Force ENT resident in training at Johns Hopkins Medical School and Hospital for processing at that institution.

The Air Force temporal bone project has been slow in getting off the ground due, at least in part, to changing personnel. An effort is now being made by the AFIP to have the whole situation reviewed and re-evaluated with the purpose of establishing the project on a firmer foundation and of breathing some life into it.

With respect to the broader aspect of the study of temporal bones, the Director of the

TABLE I

SOURCES OF CASES IN THE REGISTRY OF OTOLARYNGOLOGIC PATHOLOGY
AS OF AUGUST 31, 1960

CONTRIBUTOR	CASES ABSTRACTED		
	TOTAL	DURING PRIOR YEARS	SEPT. 1, 1959 THRU AUG. 31, 1960
	NUMBER		
Total	7,049	6,537	512
Army	2,609	2,549	60
Navy	518	468	50
Air Force	241	214	27
Veterans Administration	2,278	1,962	316
Civilian	1,309	1,253	56
Other sources*	94	91	3
	PERCENTAGE		
Total	100	100	100
Army	37	39	12
Navy	7	7	10
Air Force	3	3	5
Veterans Administration	32	30	62
Civilian	19	19	11
Other sources*	2	2	1

*Other governmental and quasi-governmental agencies.

Armed Forces Institute of Pathology has indicated his interest in the suggestion that a temporal bone center be established at the AFIP and has agreed to its logic. He would be further interested in a statement from the Committee on what was envisaged for such a center in the way of personnel, equipment, and functions.

IV. *Residencies*

During the past year an arrangement was entered into between the ENT Service of the Washington Medical Center, a private hospital in Washington, D. C., and the AFIP whereby two ENT residents from the former institution are assigned annually to the ENT Pathology Branch of the AFIP for a 13-month training period. These training periods alternate with similar training periods for ENT residents from the Walter Reed Army Hospital.

V. *Registry of Otolaryngic Pathology*

The annual report on the Registry of Otolaryngic Pathology prepared by the Medical Statistics Section of the AFIP with the collaboration of the Registrar is appended hereto.

The Registry of Otolaryngic Pathology contains 7,356 cases, 506 of which were selected by the Registrar during the period 1st of September 1959 through 31st August 1960.

TABLE II

REGISTRY OF OTOLARYNGIC PATHOLOGY BY ANATOMIC SITE AND TYPE OF MATERIAL

ANATOMIC SITE	TOTAL NUMBER	TYPE OF MATERIAL (PERCENT)		
		SURGICAL	SURGICAL AND AUTOPSY	AUTOPSY
Total	7,049	90.0	7.0	3.0
Neck	3,220	92.0	6.0	2.0
Superficial neck	331	99.0	1.0	
Deep neck	2,889	91.0	7.0	2.0
Nose	1,449	94.0	4.0	2.0
Nasal chamber	1,089	97.4	2.2	1.0
Paranasal sinus	323	84.0	9.0	7.0
Chamber and sinus	23	70.0	26.0	4.0
Skin	14	93.0	7.0	
Pharynx	1,733	82.0	13.0	5.0
Nasopharynx	451	77.0	16.0	7.0
Oropharynx	1,279	84.0	12.0	4.0
Naso- and oropharynx	3	67.0	33.0	
Ear	537	93.0	4.0	3.0
Internal ear	467	93.0	4.0	3.0
External ear	70	96.0	1.0	3.0
Temporal Bone	100	68.0	11.0	21.0
Other sites	10	80.0	10.0	10.0

Tables 1 and 2 present information on the 7,049 cases which have been abstracted to date. Approximately one fifth of this total are from civilian physicians. However, in recent years, only about one tenth or less of the cases have been from civilian sources. Nevertheless, there is also much material in the Registry relating to civilian dependents of servicemen.

In addition to the 7,356 cases in the Registry of Otolaryngic Pathology, there were at last count 5,980 cases in the Registry of Dental and Oral Pathology which are of direct interest to otolaryngologists, as well as an unknown portion of the 1,712 cases which are now grouped as "jaw and teeth." An accurate count of such dental and oral pathology cases will be provided in the next annual report.

The 5,980 cases involving the mucous membrane, tongue, lips, cheeks, salivary and lymph glands, and the antrum are distributed as follows:

DIAGNOSTIC GROUP	NUMBER
Total	5,980
Malignant tumor	1,799
Benign tumor	2,235
Diagnosis other than tumor	1,946

VI. *Finances*

As a result of the concerted effort by the Scientific Director of the American Registry of Pathology and various Registrars to acquaint the different sponsoring societies with the increasing urgency of the need for operat-

ing funds, several societies have resumed their annual contributions and others have increased theirs.

Although this Committee passed a motion at the last meeting recommending to the Council that the Academy resume its support of the Registry of Otolaryngic Pathology, there has been no implementation of that recommendation to date.

PRELIMINARY REPORT ON THE STUDY OF SQUAMOUS CELL CARCINOMA OF THE LARYNX (COMBINED INTRINSIC AND EXTRINSIC CARCINOMAS)

The Registry of Otolaryngic Pathology has records of approximately 900 patients with squamous cell carcinoma of the larynx surgically removed in 1954 and earlier years. As reported last year, these patients are currently being followed and the data are being analyzed to provide survival rates and other information of value to clinicians and pathologists for the making of prognoses. To date, follow-up data have been received on 532 patients.

The actuarial survival rates shown in the accompanying table and chart are computed on the basis of actual deaths occurring among the 532 patients within yearly intervals after removal of the squamous cell carcinomas from the larynx. These are translated into expected survivals per 100 hypothetical patients. The data presented are classified according to the type of tissue involved; however, more comprehensive analyses will be made when the follow-up and histologic studies are completed.

In summary, there were 41 of the 532 patients in whom the mucosa only was involved; in 259, the submucosa; and in 62, there was also involvement of the lymphatic glands. The periods of median survival or the year to which 50 per cent of one hundred patients with similar characteristics would be expected to survive and the percentages surviving at 15 or more years are as follows:

All patients, median survival, 5.7 years, with 32 per cent surviving 15 or more years; patients with involvement of mucosa only, 65 per cent survival for 15 or more years; with submucosa involvement, a median of 8.4 years, with 34 per cent surviving 15 or more years. Among the 62 with involvement of the lymph-

TABLE III

SQUAMOUS CELL CARCINOMA OF THE LARYNX ACTUARIAL SURVIVAL RATES BASED ON A PRELIMINARY STUDY OF 532 CASES IN THE REGISTRY OF OTOLARYNGIC PATHOLOGY (COMBINED INTRINSIC AND EXTRINSIC CARCINOMAS)

INTERVAL (YRS.) FROM SURGERY TO LAST FOLLOW-UP	SURVIVAL RATES			
	ALL PATIENTS	SITE OF INVASION		
		MUCOSA	SUBMUCOSA	LYMPHATICS
0 - 1	100.0	100.0	100.0	100.0
1 - 2	80.4	97.6	87.3	54.5
2 - 3	67.6	95.2	74.5	39.6
3 - 4	61.4	95.2	66.7	31.4
4 - 5	55.7	87.9	61.7	24.8
5 - 6	51.0	85.5	58.5	16.2
6 - 7	49.6	85.5	56.7	16.2
7 - 8	47.8	78.8	54.8	16.2
8 - 9	45.1	78.8	52.3	16.2
9 -10	39.8	70.3	44.7	16.2
10-11	36.9	65.4	41.6	16.2
11-12	36.3	65.4	40.4	16.2
12-13	34.2	65.4	37.5	0.0
13-14	32.6	64.7	35.8	.
14-15	32.6	64.7	35.8	.
15 and over	31.6	64.7	33.6	.
Number of patients in group	532	41	259	62

atic system, one-half would survive only 1.4 years; the last patient in this group died between the eleventh and twelfth year after surgery.

It is important to note that in arriving at these preliminary statistics, the statisticians were not in position to separate the extrinsic from the intrinsic laryngeal carcinomas and to analyze them individually. Even though such a preliminary analysis can have little practical application, it does present some interesting data and it does indicate one type of approach that can be followed in the final analysis of the material.

REPORT OF THE COMMITTEE FOR RESEARCH IN OTOLARYNGOLOGY

HAROLD F. SCHUKNECHT, Chairman

At its last business meeting on October 10, 1959, the Committee for Research in Otolaryngology voted to replace Dr. Victor Goodhill and Dr. Joseph Sataloff with Dr. George Misrahy and Dr. Richard Bellucci. The members of the Committee for Research for the year, therefore, are as follows: Richard Bellucci, M.D.; Cesar Fernandez, M.D.; Aram Glorig, M.D.; Merle Lawrence, Ph.D.; George Misrahy, M.D.; W. Dewey Neff, Ph.D.; Gunnar O'Neil Proud, M.D.; Harold F. Schuknecht, M.D., Chairman; Ben H. Senturia, M.D.; Catherine Smith, Ph.D.; Juergen Tonndorf, M.D.; Hans von Leden, M.D.

The third annual meeting for Research in Otolaryngology was held at the University of Chicago Clinics on October 10, 1959, where eleven papers were presented on a variety of subjects covering research in the field of otolaryngology. The Program Chairman was Dr. W. D. Neff.

Dr. Hans von Leden was appointed chairman for the 1960 program and has arranged for twelve research papers to be presented on October 8, 1960, at Northwestern University Medical School, 303 East Chicago Avenue, Chicago.

On the recommendation of this Committee, the Academy presented certificates and monetary awards of $500.00 for excellence in original investigation to the following individuals on October 12, 1959.

Irving M. Blatt, M.D.
"Sialography"

Stanley D. Greenberg, M.D.
"Tracheal Homografts"

Brian F. McCabe, M.D.
"Effects of Intense Sound"

T. Manford McGee, M.D.
"Streptomycin Ototoxicity"

The Awards Subcommittee, with Doctor Juergen Tonndorf as Chairman, has selected the 1960 award winners, who are to receive a certificate and a $400.00 monetary award at the forthcoming annual Academy meeting.

A. Panagopoulos, M.D.
"Bone Involvement in Maxillofacial Cancer"

G. W. Allen, M.D.
"The Mechanism of Bone Conduction"

F. R. Kirchner, M.D.
"Method for the Identification and Localization of Cerebrospinal Fluid, Rhinorrhea and Otorrhea"

George T. Singleton, M.D.
"Experimental Fracture of the Stapes in Cats"

Frank N. Ritter, M.D.
"Reversible Hearing Loss in Human Hypothyroidism and Correlated Changes in the Chick Inner Ear"

The next business meeting of the Committee will be held on Tuesday, October 11, 1960, at 12:30 p.m., at the Palmer House.

Next year's activities of this Committee will consist again of sponsoring the annual Research Meeting and selecting research award winners for 1961.

Budget Requests for 1961: (1) $2000.00 for annual awards for original investigation in otolaryngology; (2) Adequate funds to provide for luncheon and meeting place for the annual business meeting.

The Committee for Research in Otolaryngology is unanimously of the opinion that the speakers at the annual Research Meeting be permitted to publish when and where they wish rather than have the Academy require publication in the TRANSACTIONS. It is the desire of the Committee to hold these meetings in an informal atmosphere where there would be a free exchange of ideas without the worry of preparing a finished paper for publication.

Also, it is our hope that the Council will approve the continued use of the Saturday preceding Academy week for the annual Research Meeting.

At its last annual meeting, the Committee voted unanimously to request the Council of the American Academy of Ophthalmology and Otolaryngology to appoint Dr. Gunnar Proud, Professor of Otolaryngology, University of Kansas School of Medicine, Kansas City, Kansas, as its new chairman to replace Dr. Harold F. Schuknecht. The Committee believes that the objectives of the Research Committee are best served if a new chairman is selected every two or three years.

REPORT OF THE COMMITTEE ON STANDARDIZATION OF TONOMETERS

ELMER J. BALLINTINE, Chairman

Tonometer Specification

Specification No. 5, adopted October 13, 1959, was sent to the manufacturers and testing laboratories concerned with the recommendation that the specification be given a six-month trial and that after March 15, 1960, all tonometers be certified to this specification. Despite numerous conferences with the interested parties over the past several years, in which it seemed that the new specification was thoroughly understood and acceptable to all those concerned, the tonometers of several manufacturers have failed to meet the specification consistently in several respects. Most of these failures are in tonometers that were in the process of being manufactured during the past year before the new specification was adopted, and in those cases where the tonometer met the old specification (No. 4) the testing laboratories were allowed to continue to certify them as complying with Specification No. 4.

Failure of new tonometers to meet Specification No. 5 has been mainly in the electrical tonometers where the specification for friction between plunger and footplate has been the cause of the rejection. The reason for this high rejection rate is being investigated by the Cleveland testing station, V. Mueller & Co., and the Inland Testing Laboratories, and we expect within the next year to resolve this difficulty.

The second main difficulty was in the specification for concavity of the plunger footplates. The inspection of this feature requires some skill and, at first, resulted in some disagreement among testing laboratories. This difficulty has now been resolved and the commercial testing laboratories are in almost complete agreement on their inspections.

The manufacturers of tonometers have had considerable difficulty in meeting this feature of the specification, and the Committee, therefore, has undertaken the development of a new profile for the plunger which will eliminate the concavity and permit the use of a flat-based plunger. With the cooperation of the manufacturers, suitable plungers have been furnished to the Committee and the work of validating their use is underway. It is expected that within a few months it will be possible to permit the manufacturers to use this simplified form of plunger, and that the readings of tonometers furnished with this plunger will be consistent with the tonometer readings made with the old concave-based plunger. The adoption of the new form should result in considerable savings in manufacturing and inspection costs. The Committee, for the present, would like to refrain from publishing Specification No. 5 until the difficulties discussed above have been resolved completely.

Testing Station

The Cleveland Testing Station continued to test tonometers submitted by individuals, and a report of its activities is appended.

Experimental work on testing methods, simplification of the tonometer specification, and investigation of peculiar deviations in tonometers reported by members of the Academy from time to time were continued. This work was greatly expedited by the services of a full-time technician, part of whose salary was paid by the Academy.

Commercial Testing Laboratories

The Inland Testing Laboratories of Cook Technological Center, Morton Grove, Illinois, have continued their excellent work in their rigorous inspection of electric tonometers and in the development of better testing methods.

The Electrical Testing Laboratories of New York have continued to be the only laboratory certifying mechanical tonometers.

Membership

Dr. W. R. F. Luke, who is in charge of the tonometer testing station at the Banning Institute, Toronto, Ontario, has agreed to serve as a member of the Committee.

Symposium on Tonometry and Tonography

Dr. Peter C. Kronfeld, as moderator of the symposium on tonometry and tonography to be presented as part of the program of the Annual Meeting of the Academy in October 1961, has presided at several meetings of the participants in the symposium, and the symposium will be presented as scheduled.

Exhibit on Tonometer Calibration

The Committee has prepared a scientific exhibit to be presented at the Annual Meeting of the Academy in October 1960 which will supplement the symposium. Dr. Kronfeld has done most of the work in preparing this exhibit.

Future Plans

Work will be continued on the problems incidental to the general adoption of Specification No. 5 for tonometers. The accumulation of experience with the new form for tonometer plunger is underway and will be continued by the members of the Committee in their clinics. The work load on the tonometer testing station has increased and the need for this service continues. The Chairman recommends, therefore, that the activities of the Committee be continued.

REPORT OF THE COMMITTEE ON USE OF DIAGNOSTIC PROCEDURES AND THERAPY IN UVEITIS

A. D. Ruedemann, Chairman

This Committee, authorized by the Council and appointed in 1957, has not held a meeting since March 1959. At none of the called meetings has there been an attendance of the full Committee. While no resignations have been received, it is quite evident that the Committee is not functioning because of the disinterest of several members. The study as originally outlined in the request for a grant from National Institute on Neurological Diseases and Blindness is continued under renewal of the grant, and supplies of testing material and facilities for serology are available.

Reports from the CDC laboratory to July 31, 1960, number approximately 4,200. On July 31, 1960, the CDC laboratory closed its service on the serology for the uveitis tests and that part of the service was taken over by the South Bend Medical Foundation, where the Sabin Feldman Dye Test for toxoplasmosis and agglutination tests for brucellosis and leptospirosis will be made on sera sent by collaborators in the study on the etiology of uveitis.

The booklet of directions was revised by a Committee consisting of Doctors Leopold, Wahlen, Goldman and Alan Woods as consultants, thereby simplifying the patient reports.

The proposed establishment of pilot centers, where it was expected that twenty-five or more uveitis patients and an equal number of controls would test the value of the study, has not been accomplished. While there are several centers from which reports of more than twenty-five patients a year are completed, there is no co-ordination between centers and no technical supervision by the Committee. The administration of the study has been done entirely in the office of the director, the Executive Secretary of the Academy. There is a general agreement among the Committee that since it does not function, its continuance is not necessary to the study; therefore, they recommend its dissolution.

REPORT ON THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

M. Elliott Randolph
Academy Representative

As representative of the Academy to the American Association for the Advancement of Science, I wish to report that there are no matters of importance concerning the activities of the Association to be brought before the American Academy of Ophthalmology and Otolaryngology for the year 1959-60.

REPORT ON THE AMERICAN BOARD OF OPHTHALMOLOGY

Alson E. Braley
Academy Representative

The American Board of Ophthalmology has held 118 examinations to the present time. There have been 5,053 certificates issued.

In 1960 the written examination was held on January 25 in 24 cities. Two hundred and nineteen applicants took the examination. Of these, 173 passed while 46 failed.

To the present time 179 applications have been received for the 1961 written examinations.

There are 102 sets of slides available which are sent out for rental; 195 slide rentals have been available during the past year.

During 1959 the following practical and oral examinations were given: In Philadelphia on June 3-6, 1959, where 130 candidates took the examination: 113 passed, 4 failed, and 13 were conditioned. In St. Louis on October 7-10, 1959, where 74 candidates took the examination: 49 passed, 3 failed, and 22 were conditioned. In San Francisco on May 7-13, 1960, where 121 candidates were examined: 102 passed, 9 failed, and 10 were conditioned.

The practical and oral examination scheduled for 1960 will be held in Chicago at the Illinois Eye and Ear Infirmary in the week preceding the Academy meeting; approximately 80 candidates will be examined.

The scheduled meeting in Boston in May 1961 was cancelled because of the lack of candidates due to the readjustment of the extra year of practice following the residency program. The only examination to be held in 1961 will be held in October in Chicago.

Sixty-four ophthalmologists have served on the Board since 1916. There are 13 board members, 4 consultants and 3 emeritus members.

The officers for 1960 are:

Chairman: Kenneth C. Swan, M.D.
Vice Chairman: Alson E. Braley, M.D.
Secretary-Treasurer: Merrill J. King, M.D.

REPORT ON THE AMERICAN BOARD OF OTOLARYNGOLOGY

Francis E. LeJeune
George F. Reed
Academy Representatives

As representatives of the American Academy of Ophthalmology and Otolaryngology to the American Board of Otolaryngology, we wish to report that the American Board of Otolaryngology held an examination in Chicago from October 5 to October 9, 1959. One hundred candidates were examined at that time and, of this group, sixty-two passed, thirty-four were conditioned, and four failed the examinations. Dr. Bernard J. McMahon was elected president of the Board, and Dr. Werner Mueller was elected vice-president. The secretary, Dr. Dean Lierle, was re-elected. A meeting of the Credentials Committee of the Board was held on Sunday, May 8, and sixty-three applications were reviewed.

REPORT ON THE AMERICAN COMMITTEE ON OPTICS AND VISUAL PATHOLOGY

Kenneth C. Swan
Academy Representative

As the Senior representative, I am submitting to the American Academy of Ophthalmology and Otolaryngology the report of the American Committee on Optics and Visual Physiology for the past year. Other representatives of the American Academy of Ophthalmology and Otolaryngology are Frederick C. Cordes and James E. Lebensohn. The Section on Ophthalmology of the American Medical Association, the American Ophthalmological Association and the Association for Research in Ophthalmology are each represented by three members. During the past year, Dr. Conrad Berens has served as Chairman, and Dr. Gerald Fonda as Secretary.

The seventy-fourth meeting of the Committee was held in Chicago on October 11, 1959. In addition to the regular members of the committee, Louise Sloan, Ph.D., of Baltimore and Louis J. Girard, M.D., of Houston attended by invitation.

The Committee considered standardization of distance and reading types, screening tests for color vision, and low-vision lenses. The Committee reaffirmed the viewpoint expressed by Dr. Fonda in a report made to the Committee in 1958. This report was published in detail in the 1959 report to the Academy by James Lebensohn. Some members of the subcommittee on Low-Vision Aids felt that further investigation was needed in regard to telescopic units which employ a strong plus lens in a spectacle frame, with a high minus ocular in a contact lens. As yet, no report has been found in the scientific literature which proves that such a telescopic unit is of practical value. Dr. Girard has had some experience with contact lens telescopic units for

two patients and will report on this subject at the 1960 meeting.

Dr. Carl Rudolph, as Chairman of the subcommittee on Standardization of Ophthalmic Lenses, reported that many lenses going to patients of ophthalmologists are not first quality. After considerable discussion, the Committee agreed to investigate standardization of ophthalmic lenses, including contact and safety lenses. Other subcommittee reports concerned the standardization of terminology of motor anomalies and standardization of terminology of optics and visual physiology. Progress is being made in both fields. Of particular interest was a special report by Dr. Girard, Joseph Soper, and Richard Camp of Houston, Texas, concerning corneal lenses. The report noted a rapidly increasing demand for contact lenses, but a relative lack of interest on the part of ophthalmologists, as evidenced by relatively infrequent reports in the ophthalmologic literature about contact lenses. The report noted that the ophthalmologist generally assumed all responsibility for the technician fitting lenses as his agent; therefore, there is need for education of ophthalmologists in the technique of fitting contact lenses and a recognition of the well-fitted lens. The report also discussed the relative role of optometry and opticianry in contact lens fitting, and particularly noted the lack of national standards for certification of contact lens technicians. At the time of this report, in October 1959, the State of Texas was the only state to certify contact lens technicians. Other problems concerned with contact lenses are lack of standards of manufacture, standards of nomenclature in defining the characteristics of contact lenses, and the need for more definition of the responsibilities of the ophthalmologist and the technician in the fitting of contact lenses. Recommendations were made to the American Committee on Optics and Visual Physiology for solution of some of the contact lens problems by Dr. Girard's subcommittee. These recommendations will be considered at the October 1960 meeting.

The meeting closed with the re-election of Dr. Conrad Berens as Chairman, and Dr. Gerald Fonda as Secretary-Treasurer.

The American Committees on Optic and Visual Physiology recommends (1) that the American Academy of Ophthalmology and Otolaryngology continue its sponsorship and financial support of the committee; (2) that the American Academy of Ophthalmology and Otolaryngology consider contact lenses as a subject for one of its major symposia; (3) that Dr. Goodwin Breinen of New York be named to replace Dr. Kenneth C. Swan as representative in the American Academy on the American Committee on Optics and Visual Physiology, effective January 1, 1961.

REPORT ON THE AMERICAN ORTHOPTIC COUNCIL

JOHN W. HENDERSON
FRANK D. COSTENBADER
PHILIP KNAPP
Academy Representatives

The twenty-fifth meeting of the American Orthoptic Council was held in Chicago, Illinois, on October 10, 1959, Dr. Philip Knapp, President, presiding. Representing the American Academy of Ophthalmology and Otolaryngology were Dr. John W. Henderson, Dr. Frank D. Costenbader, and Dr. Philip Knapp. Dr. Henderson has again served as Chairman of the Instruction Committee. Dr. Costenbader is Chairman of the Committee on Title and Function and Chairman of the Examinations Committee. Dr. Knapp has been president of the Council during the past year, his second term in this office.

Activities of the Council during the year 1959-1960 have included the following:

1. Twenty-nine orthoptic technician candidates for certification were examined in the annual written and oral examinations given in August and October, 1959. Twenty-nine candidates received a passing grade and were certified by the Council.

2. The Council approved the establishment of a library (by the American Association of Orthoptic Technicians) of books and other material pertaining to neuromuscular anomalies of the eyes, in memory of Miss Jean Robinson. Such a library should fill a definite need for those orthoptic technicians employed in areas some distance from established medical libraries.

3. The annual Basic Course in Orthoptics for Technicians was again held in Ann Arbor, Michigan, in 1960, under the direction of Dr. John W. Henderson. Twenty students enrolled in the course. Although in the past the course has enrolled students without prior practical experience, after January 1, 1961, a minimum of three months practical training will be required of those students enrolling in the Basic Course, thus making the didactic portion of the Course more valuable to them.

4. Volume X of the American Orthoptic Journal appeared in the spring of 1960, under the editorship of Dr. Webb P. Chamberlain. The Journal continues to be highly popular as a source of scientific information and news items relating to orthoptics and is eagerly received by all technicians. It is available to all members of the American Academy of Ophthalmology and Otolaryngology, on request, and is published as a supplement to the TRANSACTIONS of the Academy.

5. The American Association of Orthoptic Technicians held its annual meeting as usual in conjunction with the annual meeting of the American Academy of Ophthalmology and Otolaryngology. Instruction courses and a general scientific program were well attended by technicians. The joint scientific meeting of the Association and the Council was held on Sunday, October 11, 1959. An overflow crowd attended the symposium on "Pleoptics" presented by Dr. Hermann Burian of Iowa City, moderator, Dr. Gunter von Noorden, Iowa City, Miss Geraldine Wilson, New York, Dr. James Miller, St. Louis, and Miss Nancy Capobianco of Rome, Italy. The Lancaster award was presented by the Association in 1959 to Miss Dorothy Bair.

6. At the suggestion of Dr. Blasingame, Executive Secretary of the American Medical Association, the Council is investigating the advisability of incorporation. A proposed charter and by-laws are being drawn up and will first be submitted to the Council members and then to the sponsoring organizations for approval before definite action is taken. Incorporation will in no way alter the close relationship between the Council and its sponsoring organizations and will not render the Council less dependent on them for advice and guidance. It will, however, relieve the sponsoring organizations and the individual Council members of any liability (however remote) for actions of the Council.

7. Officers elected to serve in 1960 are:

President .....Philip Knapp
New York

Vice-President ....Frank D. Costenbader
Washington, D. C.

Secretary-Treasurer ..Edmond L. Cooper
Detroit

The American Orthoptic Council thanks the American Academy of Ophthalmology and Otolaryngology for its continued interest and support.

Your representatives respectfully recommend:

1. That the American Academy of Ophthalmology and Otolaryngology continue to sponsor the American Orthoptic Council and that it appoint Dr. John W. Henderson of Ann Arbor, Michigan, to the Council for a period of 3 years, beginning January 1, 1961.

2. That the American Academy of Ophthalmology and Otolaryngology support the Council in the amount of $200.00 for the year 1961.

REPORT ON AMERICAN COLLEGE OF SURGEONS BOARD OF GOVERNORS

JAMES V. BOLGER
Academy Representative

The 1959 American College of Surgeons Annual Clinical Congress was held in Atlantic City, N. J., September 28 through October 2 with a registration of 6,550 doctors. The scientific program for both the general and specialist surgeon was of customary high quality. A one-day program was devoted to cancer of the upper respiratory tract and larynx and rehabilitation surgery for the otolaryngologists. The program in ophthalmic surgery was held in joint session with the Pennsylvania Academy of Ophthalmology and Otolaryngology and consisted of a panel discussion on the management of glaucoma. The panelists were eminent ophthalmologists, respected authorities on this subject.

At the Annual Meeting of the Board of Governors, reports were given concerning (1) the progress of the International Federation of Colleges and Societies of Surgery; the American College of Surgeons being the only United States representative of the Society. The International Federation was formed to raise the standards of surgery and is recognized by the World Health Organization as its nongovernmental affiliate in surgery; (2) the urgent need for a new College headquarters; and (3) the Joint Commission Accreditation of Hospitals.

The Executive Committee of the Board of Governors reported, recommending: (1) increasing Fellowship dues, (2) several topics for discussion at the 1960 Sectional Meetings which would form a basis for the agenda of the Board of Governors Meeting at the 1960

Clinical Congress. These subjects dealt with measures to improve standards of hospitals, surgical training and certain ethical considerations involving surgical practice, subjects of great interest and importance to the fundamental beliefs of the American College of Surgeons, and (3) Ammending Article III of the College by-laws, increasing the number of Governors elected at large from 84 to 110. Dr. Paul Holinger and Dr. James Greear were elected to the Committee on nominations of the Board of Governors.

The need for a new College headquarters building has been apparent to the membership of the College for sometime. The decision to proceed with its construction was delayed until a desirable means of financing its construction was determined. This problem was solved when the Board of Regents in June 1960 voted to levy an assessment upon members of $200.00 each, to be paid in four annual installments. This plan did have certain exceptions and modifications. With the acceptance of this means of financing the building program, the Board of Regents voted to delay an increase in dues. It is hoped the new headquarters will be completed in two years time.

Dr. H. H. Bradshaw in a letter to the Governors on October 20, 1959, emphasized the deep interest the American College of Surgeons has in every field of surgery and pointed to the steps taken in recent years (1) to provide adequate representation of surgical specialties in the government of the College, (2) to ensure programs of the College meet the need of the surgical specialties as well as of general surgeons, and (3) to the formation of Advisory Councils established in each surgical specialty.

Adequate representation in Ophthalmology on the Board of Governors consists of three representatives from each of the three eye societies: (1) American Ophthalmological Society, (2) A.M.A. Section on Ophthalmology and (3) American Academy of Ophthalmology and Otolaryngology. Otolaryngological societies are similarly entitled to a representative number of Governors.

Ophthalmology was represented on the Board of Regents until 1959, at which time Dr. Cordes' term expired and no ophthalmic surgeon was elected to take his place. It is hoped that the Committee on nomination will deem it advisable to again select an ophthalmologist for this position. Dr. Dean M. Lierle has been a representative of otolaryngology on the Board of Regents.

The Advisory Council in Ophthalmology appointed by the Board of Regents consists of Dr. W. Banks Anderson (chairman), Dr. Kenneth L. Roper, Dr. S. Rodman Irvine, and Dr. Harold Scheie. Each Advisory Council will advise the Board upon all matters pertaining to its specialty; such as requirements for fellowship, scientific programs, and facilities for graduate and postgraduate education. These Councils meet at least once annually.

Attendance of the special programs for the ophthalmologists and otolaryngologists was quite representative, as 197 registered of a total of 6,550 doctors at the Atlantic City 1959 Clinical Congress. At Sectional Meetings offering special programs, (1) 40 of 563 at Louisville, (2) 215 of 3,416 at Boston, and (3) 30 attended the Rochester-Minneapolis program. No eye program was held in association with the Colorado Springs Sectional Meeting, and a single paper on an ophthalmologic subject was presented at the Portland meeting.

Because of a conflict of dates for the 1960 annual meetings of the American College of Surgeons Clinical Congress and the American Academy of Ophthalmology and Otolaryngology, the Advisory Councils in these specialties suggested that these programs be eliminated for the 1960 Congress. This overlapping of meeting dates has occurred in the past and will undoubtedly occur in the future, since both organizations prefer an early October meeting time. This seems suitable to the membership of the Academy, as evidenced in a recent poll on this matter.

It is encouraging for 1961, since the Clinical Congress will be held in Chicago, October 2 to 6. Four Sectional Meetings are planned with special programs in Ophthalmology and Otolaryngology to be held definitely in Philadelphia from March 6 to 9, tentatively in Mexico City, January 23 to 26, with no information available on the Birmingham (January 16 to 18) and Winnipeg meetings.

With the expiration of my term of office this year, there will be two vacancies on the Board of Governors to be served by representation of the Academy. Dr. Shirley H. Baron will continue on the Board, but apparently no selection was made to fill the vacancy which developed in 1958.

It has been a privilege to have represented the American Academy of Ophthalmology and Otolaryngology on the American College of Surgeons Board of Governors. The conduct,

atmosphere and discussions at each assembly in the company of intent, conscientious members made one proud and appreciative of the fellowship in surgery.

REPORT ON AMERICAN STANDARDS ASSOCIATION, ACOUSTICAL STANDARDS BOARD

EDMUND P. FOWLER
Academy Representative

The report of your representative to the American Standard Association, Acoustical Standards Board and its S-3 Committee on Bio-acoustics is as follows:

1. The new 1960 Acoustical Terminology, including mechanical vibrations, has been revised and is available from the American Standards Association, 10 East 40th Street, New York.

Also available is (a) Criteria for Background Noise in Audiometer Rooms and (b) Methods of Measurement of Monosyllabic Word Intelligibility.

2. The S-3 W-3 Writing Group on Audiometers has made minor changes in proposed audiometer specifications.

This writing group has tried to reconcile American proposals with international recommendations, not only in respect to the "zero level" (standard reference threshold level for audiometric measurements), but the various tolerances as well. If this writing group did not have the problem of affecting correlation between the proposed American Standard and the international recommendations, they would have completed their work six months ago. They have already reviewed three drafts of an international document, but there was still some difference of opinion as to the required performance of audiometers. The European view was more towards requiring accuracy sufficient for research purposes, whereas the American view is to strike a practical balance between the requirements of practicing otologists and research groups.

Dr. Kranz, chairman of this committee, estimates that it will take at least one year to get a final answer regarding the new proposal for zero level and the description of the computation method involved.

3. The Committee on The American Standard of Hearing Loss due to Noise Exposure was set up, with Dr. Aram Glorig as chairman. The committee is charged with exploring the work already done by the Europeans on this matter and is also to go into their studies on vehicular noise. It was decided that this was more important abroad than it was in the United States because of the relatively greater number of motorcycles, and that the American Standards Association would simply stay advised as to what was going on in the international field before setting up a specific committee for this subject.

A National Aircraft Noise Abatement Council has been set up. No report is actually available from them on community noise standards.

REPORT ON AMERICAN STANDARDS ASSOCIATION, COMMITTEE ON STANDARDIZATION OF OPHTHALMIC LENSES

CARL J. RUDOLPH
Academy Representative

The American Standards Association did not call a meeting this fiscal year, consequently there is very little to report. A standard of spectacle lenses has been decided upon as to tolerances and physical quality. At this time it appears that merchandising first quality lenses would be an economic hardship on the intermediary area.

Optometry obviously is no more pleased by the present assurance of lens quality than we are and apparently will use no uncertain measures in forcing a National Standard.

I would urge that Ophthalmology maintain its present structure in coping with what may be rapid developments. The public is interested in obtaining the best for its eyes and should have our assurance that it obtains the finest lenses possible. Admittedly, this is not the case, as 50 per cent of spectacle lenses purchased are of second quality or less in spite of the fact that, in many instances, the prices paid are for first quality.

Righteous indignation on the part of the public, Ophthalmology and Optometry will eventually rectify this unfortunate circumstance.

REPORT ON THE JOINT COMMITTEE ON EYE BANKS

ALSON E. BRALEY
JOHN HARRY KING, JR.
Academy Representatives

The Joint Committee on Eye Banks met on May 29, 1959 at Hot Springs, Virginia. [Names of members attending were included in the Annual Report of 1959. (TRANSACTIONS Nov.-Dec. 1959, p. 877)] At this meeting it was recommended that the Joint Committee be dissolved and be superseded by the "American Association of Affiliated Eye Banks," to be officially established and organized under the American Academy of Ophthalmology and Otolaryngology with its headquarters in Rochester, Minnesota. It was suggested that after the Association is established, a meeting should be held of all medical and lay directors of eye banks to discuss ethical medical procedures. Each member was given a suggested code of Ethics to review for final approval at the next meeting.

A second meeting of the Committee was held on October 13, 1959, at the Palmer House, Chicago. The "Code of Ethics for Eye Banks" was discussed, rewritten and approved as follows:

1. The establishment of an eye bank depends upon the need for eye tissues in a specific area where no other eye bank exists. It must be requested by the local medical society and is primarily a medical organization with qualified ophthalmologists as members of the board of directors. Administrative organization and financial support can be rendered by ethical lay organizations.

2. An eye bank should be associated with a hospital or university teaching center.

3. The purpose of an eye bank is to supply eye tissues when available to any qualified ophthalmologist requesting tissues for transplantation. A priority list of requests should be maintained so that preference is not given to any one ophthalmologist or group of ophthalmologists regardless of location in the immediate area. This list should be strictly adhered to except in the case of a bonafide emergency.

4. No fee of any kind should be charged to the recipient, the donor, the surgeon, or any intermediary. Requests for donations should not be made in lieu of a fee.

5. Race, religion, social standing, or other nonmedical considerations should not influence the allotment of eye tissues.

6. Eye banks should not advertise publicly nor should they solicit ophthalmologists by mail.

7. Local and State laws regarding the removal of eyes, transportation, and storage, must be strictly adhered to.

8. The wishes of the donor and next-of-kin must be respected and effectively carried out according to medical tradition.

9. The confidence of the donor and next-of-kin must be rigidly maintained. Personal data must be secured and not made public to any source by eye bank personnel. It is the privilege of the next-of-kin to permit publication of a donor's gift; however, this should not be solicited by the eye bank.

10. The names of recipients and donors must not be released by eye banks or surgeons supplied by eye banks for purposes of newspaper publicity, except in unusual circumstances, when a written release must be obtained from the responsible parties.

11. Financial support may be obtained from individual donors, lay organizations, memberships, grants from endowment funds, Foundations, civic organizations, or the U. S. Public Health Service, for eye bank administration and research activities. Funds should not be solicited from individuals residing in an area supported by another eye bank.

12. All publicity, with the objective of informing and educating the general public to take an active part in the eye donor program, must be approved by the Medical Advisory Committee and the Board of Directors of the eye bank. Such publicity must comply with the rules of ethics of the local medical society.

13. Fund-raising activities must conform to medical and local custom. Professional fund raisers or persons commissioned to raise funds cannot be ethically employed.

14. Donor eye pledges may be solicited only by the most dignified means. Spectacular and bizarre methods must not be tolerated. Subterfuge means of soliciting publicity in the areas of other eye banks, such as "letters to the Editor," are not considered ethical eye bank conduct.

The following resolution was approved for presentation to the Council of the American Academy of Ophthalmology and Otolaryngology in 1960.

Resolved, that since the Council of the American Academy of Ophthalmology and

Otolaryngology has voted that representation to the Joint Committee on Eye Banks be discontinued, the present Joint Committee recommends that the Council form a standing committee on eye banks; and that this committee be permitted to establish an "American Association of Affiliated Eye Banks" for the purpose of advising in the ethical conduct and medical standardization of eye bank functions.

It is recommended that the chairman of this committee be R. Townley Paton, M.D., and the secretary, John Harry King, M.D., and that an appropriation of $500 be made to cover the expenses of the committee.

No further meetings of the Committee have been held pending the dissolution of this Committee by each organization that appointed its members and the formation of the "American Association of Affiliated Eye Banks" by the American Academy. To date (September 15, 1960) no word has been forthcoming concerning the action of the American Academy of Ophthalmology and Otolaryngology.

REPORT ON THE NATIONAL COMMITTEE FOR RESEARCH IN OPHTHALMOLOGY AND BLINDNESS

BERNARD BECKER
A. EDWARD MAUMENEE
Academy Representatives

The National Committee for Research in Ophthalmology and Blindness was established under the aegis of the four national ophthalmic societies. It has functioned as a group concerned with the collection of data pertinent to research in ophthalmology and blindness and the source of support of such research.

The committee is a forum for various groups interested in this field to meet with one another and to exchange viewpoints. One happy result of this forum is permitting the exchange of ideas between groups which have never met with one another before, with much decrease in the amount of friction existing between them. Additionally, it has permitted identification of groups which are interested in research and has distinguished them from others who give only lip service to research.

Financial support of the Committee has been derived during the past year from the Association for Research in Ophthalmology, the American Ophthalmological Society, the American Academy of Ophthalmology and Otolaryngology, the Pan-American Association of Ophthalmology, the National Foundation for Medical Eye Care, the National Federation of the Blind, the National Society for the Prevention of Blindness, the American Foundation for the Blind, and Seeing Eye, Inc. Expenses of the Committee are largely related to secretarial and clerical expenses and distribution of information concerning research, largely through the Secretary's Newsletter. Representatives of the American Academy of Ophthalmology and Otolaryngology and the Secretary-Treasurer and other medical representatives to the Committee attend the meeting at their own expense.

It is recommended that the American Academy of Ophthalmology and Otolaryngology continue its contribution of $500 annually to the support of the National Committee. Previous support of the Academy is greatly appreciated.

REPORT ON THE NATIONAL CONGRESS OF PARENTS AND TEACHERS, HEALTH ADVISORY COMMITTEE

FRANK D. COSTENBADER
Academy Representative

The Health Advisory Committee of the National Congress of Parents and Teachers has not met during the past year, so the representative of the American Academy of Ophthalmology and Otolaryngology has no report to offer.

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Treasurer	Secretary	Meeting Place
1896—	Adolph Alt St. Louis, Mo.	W. C. Pipino Des Moines, Iowa	W. L. Dayton Lincoln, Neb.	Hal Foster Kansas City, Mo.	Kansas City, Mo.
1897—	Adolph Alt St. Louis, Mo.	W. C. Pipino Des Moines, Iowa	W. L. Dayton Lincoln, Neb.	Hal Foster Kansas City, Mo.	St. Louis
1898—	B. E. Fryer Kansas City, Mo.	J. E. Colburn Chicago, Ill.	W. L. Dayton Lincoln, Neb.	Hal Foster Kansas City, Mo.	Chicago
1899—	J. E. Colburn Chicago, Ill.	W. Scheppegrell St. Louis, Mo.	W. L. Dayton Lincoln, Neb.	Thomas A. Woodruff Chicago, Ill.	New Orleans
1900—	W. Scheppegrell St. Louis, Mo.	M. A. Goldstein St. Louis, Mo.	W. L. Dayton Lincoln, Neb.	Fayette C. Ewing St. Louis, Mo.	St. Louis
1901—	M. A. Goldstein St. Louis, Mo.	H. W. Wurdemann Milwaukee, Wis.	W. L. Dayton Lincoln, Neb.	W. L. Ballenger Chicago, Ill.	Cincinnati
1902—	C. R. Holmes Cincinnati, Ohio	W. L. Dayton Lincoln, Neb.	Otto Stein Chicago, Ill.	W. L. Ballenger Chicago, Ill.	Chicago
1903—	W. L. Ballenger Chicago, Ill.	C. J. Stillson Indianapolis, Ind.	Otto Stein Chicago, Ill.	Derrick Vail Cincinnati, Ohio	Indianapolis
1904—	Edward Jackson Denver, Colo.	Dudley Reynolds Louisville, Ky.	Otto Stein Chicago, Ill.	Derrick Vail Cincinnati, Ohio	Denver
1905—	Hanau Loeb St. Louis, Mo.	Derrick Vail Cincinnati, Ohio	Otto Stein Chicago, Ill.	George F. Suker Chicago, Ill.	Buffalo
1906—	Casey Wood Chicago, Ill.	J. A. Stucky Lexington, Ky.	Otto Stein Chicago, Ill.	George F. Suker Chicago, Ill.	St. Clair, Mich.

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Treasurer	Secretary	Meeting Place
1907—	J. A. Stucky Lexington, Ky.	R. A. Reeve Toronto, Canada	Otto Stein Chicago, Ill.	George F. Suker Chicago, Ill.	Louisville
1908—	Derrick Vail Cincinnati, Ohio	Joseph Beck Chicago, Ill.	Otto Stein Chicago, Ill.	George F. Suker Chicago, Ill.	Cleveland
1909—	Otto Stein Chicago, Ill.	Percy Fridenberg New York, N. Y.	S. H. Large Cleveland, Ohio	George F. Suker Chicago, Ill.	New York
1910—	Wendell Reber Philadelphia, Pa.	L. B. Lockhard Denver, Colo.	S. H. Large Cleveland, Ohio	George F. Suker Chicago, Ill.	Cincinnati
1911—	J. J. Kyle Indianapolis, Ind.	F. Parke Lewis Buffalo, N. Y.	S. H. Large Cleveland, Ohio	George F. Suker Chicago, Ill.	Indianapolis
1912—	George F. Suker Chicago, Ill.	J. W. Murphy Cincinnati, Ohio	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Niagara Falls, Ont.
1913—	J. W. Murphy Cincinnati, Ohio	J. O. McReynolds Dallas, Texas	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Chattanooga
1914—	J. M. Ray Louisville, Ky.	J. M. Ingersoll Cleveland, Ohio	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Boston
1915—	Joseph Beck Chicago, Ill.	Robert S. Lamb Washington, D. C.	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Chicago
1916—	J. E. Brown Columbus, Ohio	T. E. Carmody Denver, Colo.	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Memphis
1917—	W. L. Dayton Lincoln, Neb.	Edward Stieren Pittsburgh, Pa.	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Pittsburgh
1918—	Allen Greenwood Boston, Mass.	Virginius Dabney Washington, D. C.	S. H. Large Cleveland, Ohio	L. M. Francis Buffalo, N. Y.	Denver

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Treasurer	Secretary	Meeting Place
1919—	J. M. Ingersoll Cleveland, Ohio	Melville M. Black Denver, Colo.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Cleveland
1920—	L. M. Francis Buffalo, N. Y.	Hal Foster Kansas City, Mo.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Kansas City, Mo.
1921—	Emil Mayer New York, N. Y.	John R. Newcomb Indianapolis, Ind.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Philadelphia
1922—	Walter R. Parker Detroit, Mich.	Ross H. Skillern Philadelphia, Pa.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Minneapolis and St. Paul
1923—	T. E. Carmody Denver, Colo.	Hunter H. McGuire Winchester, Va.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Washington, D. C.
1924—	W. B. Lancaster Boston, Mass.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Montreal
1925—	Horace Newhart Minneapolis, Minn.	John M. Wheeler New York, N. Y.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Chicago
1926—	E. C. Ellett Memphis, Tenn.	Austin A. Hayden Chicago, Ill.	S. H. Large Cleveland, Ohio	Luther C. Peter Philadelphia	Colorado Springs
1927—	Ross Hall Skillern Philadelphia, Pa.	H. W. Woodruff Joliet, Ill.	S. H. Large Cleveland, Ohio	William P. Wherry Omaha, Neb.	Detroit
1928—	Luther C. Peter Philadelphia, Pa.	Frank L. Dennis Colorado Springs, Colo.	S. H. Large Cleveland, Ohio	William P. Wherry Omaha, Neb.	St. Louis
1929—	Harris P. Mosher Boston, Mass.	Frank E. Burch St. Paul, Minn.	S. H. Large Cleveland, Ohio	William P. Wherry Omaha, Neb.	Atlantic City
1930—	William H. Wilder Chicago, Ill.	Frank R. Spencer Boulder, Colo.	S. H. Large Cleveland, Ohio	William P. Wherry Omaha, Neb.	Chicago

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Ex. Sec'y-Treas.	Comptroller	Meeting Place
1931—	John F. Barnhill Miami Beach, Fla.	Meyer Wiener Coronado, Calif.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	French Lick, Ind.
1932—	S. Hanford McKee Montreal, Canada	Gordon B. New Rochester, Minn.	William P. Wherry Omaha. Neb.	S. H. Large Cleveland, Ohio	Montreal
1933—	Burt R. Shurly Detroit, Mich.	Nelson Miles Black Miami, Fla.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Boston
1934—	John M. Wheeler New York, N. Y.	LeRoy A. Schall Boston, Mass.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Chicago
1935—	Wells P. Eagleton Newark, N. J.	W. Thornwall Davis Washington, D. C.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Cincinnati
1936—	Frank E. Burch St. Paul, Minn.	Gordon F. Harkness Davenport, Iowa	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	New York
1937—	Lee W. Dean St. Louis, Mo.	Bernard Samuels New York, N. Y.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Chicago
1938—	Harry S. Gradle Chicago, Ill.	E. M. Seydell Wichita, Kan.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Washington, D. C.
1939—	George M. Coates Philadelphia, Pa.	William W. Pearson Des Moines, Iowa	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Chicago
1940—	Frank E. Brawley Chicago, Ill.	Arthur W. Proetz St. Louis, Mo.	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Cleveland
1941—	Frank R. Spencer Boulder, Colo.	Everett L. Goar Houston, Texas	William P. Wherry Omaha, Neb.	S. H. Large Cleveland, Ohio	Chicago
1942—	Ralph I. Lloyd Brooklyn, N. Y.	Walter H. Theobald Chicago, Ill.	William L. Benedict Rochester, Minn.	S. H. Large Cleveland, Ohio	Chicago
1943—	James A. Babbitt Philadelphia, Pa.	Sanford R. Gifford Chicago, Ill.	William L. Benedict Rochester, Minn.	S. H. Large Cleveland, Ohio	Chicago

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Ex. Sec'y-Treas.	Meeting Place
1944—	Lawrence T. Post St. Louis, Mo.	C. Stewart Nash Rochester, N. Y.	William L. Benedict Rochester, Minn.	Chicago
1945—	Gordon B. New Rochester, Minn.	Edmund B. Spaeth Philadelphia, Pa.	William L. Benedict Rochester, Minn.	Meeting Cancelled
1946—	Gordon B. New Rochester, Minn.	Edmund B. Spaeth Philadelphia, Pa.	William L. Benedict Rochester, Minn.	Chicago
1947—	Alan C. Woods Baltimore, Md.	Arthur C. Jones Boise, Idaho	William L. Benedict Rochester, Minn.	Chicago
1948—	Carl H. McCaskey Indianapolis, Ind.	Ralph O. Rychener Memphis, Tenn.	William L. Benedict Rochester, Minn.	Chicago
1949—	Conrad Berens New York, N. Y.	Fred W. Dixon Cleveland, Ohio	William L. Benedict Rochester, Minn.	Chicago
1950—	J. Mackenzie Brown Los Angeles, Calif.	Edwin B. Dunphy Boston, Mass.	William L. Benedict Rochester, Minn.	Chicago
1951—	Derrick Vail Chicago, Ill.	Francis E. LeJeune New Orleans, La.	William L. Benedict Rochester, Minn.	Chicago
1952—	James Milton Robb Detroit, Mich.	Georgiana Dvorak Theobald Oak Park, Ill.	William L. Benedict Rochester, Minn.	Chicago
1953—	Frederick C. Cordes San Francisco, Calif.	Thomas C. Galloway Evanston, Ill.	William L. Benedict Rochester, Minn.	Chicago
1954—	Walter H. Theobald Chicago, Ill.	Francis Heed Adler Philadelphia, Pa.	William L. Benedict Rochester, Minn.	New York

PAST OFFICERS OF THE ACADEMY

Date	President	First Vice-President	Ex. Sec'y-Treas.	Meeting Place
1955—	Algernon B. Reese New York, N. Y.	Philip E. Meltzer Boston, Mass.	William L. Benedict Rochester, Minn.	Chicago
1956—	A. C. Furstenberg Ann Arbor, Mich.	M. Hayward Post St. Louis, Mo.	William L. Benedict Rochester, Minn.	Chicago
1957—	Erling W. Hansen Minneapolis, Minn.	Louis H. Clerf St. Petersburg, Fla.	William L. Benedict Rochester, Minn.	Chicago
1958—	LeRoy A. Schall Boston, Mass.	F. Bruce Fralick Ann Arbor, Mich.	William L. Benedict Rochester, Minn.	Chicago
1959—	John H. Dunnington New York, N. Y.	Gordon D. Hoople Syracuse, N. Y.	William L. Benedict Rochester, Minn.	Chicago
1960—	Dean M. Lierle Iowa City, Iowa	Harold G. Scheie Philadelphia, Pa.	William L. Benedict Rochester, Minn.	Chicago

BOOK REVIEWS

NIGHT VISION. By G. E. Jayle and A. G. Augard. Translated by L. F. Baisinger and W. J. Holmes. Introduction by Sir Stewart Duke-Elder. Springfield, Ill., Charles C Thomas, 408 pp. 1959. $13.50.

This book is an English translation of the well-known publication LA VISION NOCTURNE ET SES TROUBLES, published in France in 1950, to which additions have been made by the authors which bring the book up to date. This is a real contribution to the English ophthalmological literature, in that it brings together nearly all pertinent facts and results of researches in the field of night vision written by acknowledged workers in the field. The book is, however, more than a mere review of the literature, for it will serve as an up-to-date reference textbook on the subject.

Nearly the first half of the book is given to a presentation of the basic facts of the light sense, in which vision in low illuminations is only part of the story. So far as these reviewers can see, this portion of the book is an excellent introduction to the light sense, since no phase of it is neglected. The central portion of the book is devoted to night vision under pathologic conditions. The last chapters of the book are given to discussion of applications of the data on night vision to a number of practical activities.

The photometric units for luminaces are defined for scotopic conditions in micromicrolamberts. Great emphasis is placed on the phenomenon of dark adaptation and all phases bearing on it. The elements of the biochemistry of the visual purple are covered, including especially the theories developed by Wald and collaborators. A chapter also deals with the quantal aspects of the threshold of light perception, particularly as formulated by Hecht, but minus the mathematical developments. It is of interest to note that the elements of electroretinography are considered with respect to rod and cone vision. Considerable space is given to visual acuity under both scotopic and photopic illumination. Other topics include critical flicker frequency, afterimages, night myopia, central scotomas with dark adaptation, and the effect of local factors such as pupil size and age on dark adaptation. Only the subject of color perception is omitted, and this logically so.

The mid-portion of the book is devoted to those variations of night vision under pathologic conditions. There is a full discussion of dietary deficiencies with particular reference to vitamin A, with an evaluation of experimental studies on both human and animal subjects.

Disturbances of night vision in pregnancy and in liver, thyroid, digestive tract, skin, pulmonary, kidney and other diseases are reviewed, and in this the probable association with altered vitamin A metabolism is pointed out.

The succeeding section deals with the relationship between ocular pathology and faulty night vision. Included are glaucoma, tapeto-retinal degenerations both peripheral and central, in congenital and acquired forms, and the relationship in disorders of color vision. Acquired diseases of the retina and choroid including retinal detachment are discussed, followed by descriptions of studies of the light sense in lesions of the optic pathways.

This section of the book reviews pertinent experimental researches in recent electroretinographic studies of ocular diseases.

Among the practical applications of night vision theory and data are the value of preadaptation with red goggles, the effect of dazzle, how instruction may be used for the improvement of seeing in low illuminations, etc. A considerable discussion is given to the problem of automobile driving at night, the problem of headlight design, and the problem of seeing the pedestrian along the road. The problems of efficient vision for the pilot in aerial activities at night are also considered. The illumination of the airfield for landings and take-offs, the provision of maps for the dark-adapted eyes of the pilot, the lighting of the cockpit, etc., are reviewed. The final chapter is devoted to practical methods of making examinations of night vision and to a description of various adaptometers that are available. Testing under actual field conditions is recommended. An extended bibliography of texts, monographs and specific references is appended.

The reviewers recommend this book to all ophthalmologists and workers in visual physiology, as a readable and up-to-date summary of the pertinent facts of night vision.

K. N. O.
T. J. K.

VISUAL FIELD DEFECTS AFTER PENETRATING MISSILE WOUNDS OF THE BRAIN. By Hans-Lukas Teuber, William S. Battersby, and Morris B. Bender. Published for The Commonwealth Fund, by Harvard University Press, Cambridge, Mass. Board cover. 143 pages including hundreds of references, a subject index, author index and index of cases. 55 figures, including drawings, tables, graphs, charts of visual fields, roentgenograms and photographs. $4.75.

This is an analysis of the findings of a number of cases of penetrating brain injury, some old, some recent, case reports from literature and case studies done by the authors in the United States Naval Hospital in San Diego, California, during World War II and resumed at the Psychophysiological Laboratory (New York University-Bellevue Medical Center).

Using routine perimetry and other adjunct studies the visual field defects were correlated with the site of the known injury. Some unexpected findings led to more complete understanding of the visual pathways and cortical representation of visual field localization problems.

"A careful inspection of the visual fields with special regard for macular sparing or its absence reveals, first, that sparing occurs in many instances, and second, that it happens under such a variety of conditions that any single interpretation appears inadequate. In particular, our observations detract from the view that macular sparing should invariably occur with lesions in one situation (e.g., in the occipital lobe), and never with lesions in another (e.g., the optic tract)."

Such observations are directed to other types of visual field defects that are considered consistent enough to be utilized for localization of blocks in the visual pathways for surgical purposes. This report is a combined atlas and text that requires reading and study for comprehension of its significant revelations. Recommended for neurosurgeons, psychiatrists, physiologists and ophthalmologists.

W. L. B.

THE CLOWN FAMILY SPEECH BOOK. By Morris P. Pollock and Miriam S. Pollock, Springfield, Ill., Charles C Thomas, 1960. 104 pp. $6.50.

The purpose of this book is to assist teachers and parents in developing correct speech in children. The book has three basic parts: a series of stories, suggestions for teachers, and a speech workbook.

The stories are arranged in five chapters, each of which deal with a logical group of activities for family participation. The interest of children is invited by making each member of the family and each pet a clown and by giving each one an unusual name. Both the names and the activities are designed to bring about definite and useful speech exercises.

The book is intended to be fun for children. Its aim is to teach by entertaining and by inducing participation in speech activities. Speech development and correction are based on four factors: listening, imitation, repetition of sounds, and the desire for praise in successful achievement.

Although this reviewer has not utilized this text in actual teaching, the material seems well chosen and arranged for the purpose stated. The suggestions for teaching are detailed enough for careful direction of activities and at the same time simple enough for most teachers and parents to follow with ease. The speech workbook is self-explanatory and should prove helpful in promoting and sustaining interest in speech practice.

While this work appears something less than a new or unique method of teaching speech, it does provide interesting material and valuable suggestions for stimulating and directing practice in speech production. Very likely many elementary-grade teachers and parents, as well as speech therapists, will find it useful.

L. D. H.

EYE SIGNS IN GENERAL DISEASE. By F. Herbert Haessler, M.D., Springfield, Ill., Charles C Thomas, 1960. Board cover. 113 pp. plus index. No il. $5.75.

The incidence of eye symptoms pathognomonic of systemic disease has been charted for a number of congenital disorders and is known in an increasing number of chronic diseases and in senescence. Eye signs of endocrine and nervous diseases probably head the list. The author has reached back in his clinical experience to guide him in delineating the important signs and to indicate their signficance in physical examination. In the opening chapter, "How to Look," he outlines the procedure of physical examination. In following chapters, the ocular functions are described and abnormalities are pointed out as indicators of disturbed functions as a symptom of disease. The symptomatology of external eye changes is first discussed, including lid paralysis, disturbances of ocular motility, and a number of local pathologic lesions. The ophthalmoscopic findings in the fundus are briefly described as generally typical of clinical entities. The significance of the findings are then given.

The purpose of the book is to serve as a desk copy for quick reference, and it is helpful to the ophthalmologist as well as the internist. Students will profit by keeping a copy handy.

W. L. B.

REVIEW OF A FUNCTIONAL APPROACH TO NEUROANATOMY. By Dr. Earl L. House and Dr. Ben Pansky. New York, The Blakiston Division, McGraw-Hill Book Co.

Now and then an unusual book appears on the medical horizon and this treatise can be placed in that category.

In the preface, the authors state that the book was written primarily for the medical student and they have adopted many original and unique features, including many original and concise black and white line drawings, to simplify and clarify the study of neuroanatomy. They have made a functional classification of afferent and efferent systems and reflexes, with emphasis on the reflexes.

Especially well done are the chapters on hypothalamus and thalamus with their connections and clinical considerations; the cerebellar, extrapyramidal and pyramidal modifications and control of muscular activity; the anatomy of the brain; the vascularization of the brain and its covering; the cerebrum, and the functional components of the peripheral nerves. The chapter on trends in evolution from a small cell organism to man gives a basic foundation and terminology for a clearer understanding of the whole book.

The well organized summary at the end of each chapter, the line drawings, the well selected clinical cases, the atlas of cross-sections, and the excellent bibliography, in addition to the clinical considerations presented in the text, make this book a valuable vade mecum in neuroanatomy.

J. D. H.

LECTURE NOTES ON OPHTHALMOLOGY. By Patrick D. Trevor-Roper. Springfield, Ill., Charles C Thomas, 1960. 94 pp. 76 il. (12 in color). $3.50.

This brief manual meets admirably the purpose for which it was designed—a guide to ophthalmology for medical students. Its space is equally divided throughout between text and illustrations. The textual material is concise, the illustrations carefully selected and accurately reproduced. The author has presented in brief form the current methods and concepts of present day practice of ophthalmology with emphasis on diagnosis.

C. W. R.

THE TRANSPARENCY OF THE CORNEA. A Symposium organized by The Council for International Organizations of Medical Sciences. Established under the joint auspices of UNESCO and WHO. Edited by Sir Stewart Duke-Elder and E. S. Perkins. Springfield, Ill. Charles C Thomas, 268 pp. $10.00.

This book reports the second symposium for ophthalmology organized by the Council for International Organizations of Medical Sciences. The participants for presentation and discussion of papers are well known for their research and clinical work with the cornea. The general outline of presentations includes anatomy, physics of transparency, physiology, metabolism, wound healing, degenerations and vascularization. The discussions of the papers are valuable to the reader for clarifying known or proven facts from theory or opinion.

The importance of the endothelium and epithelium of the cornea to transparency and corneal swelling is given considerable discussion. The problem of vascularization and its treatment is discussed.

Suggestions and possibilities for research are presented by several discussors.

Much of the discussion is aimed at solving the problems of corneal grafts. More research in physiology should lead to the answers to some of these problems. One would hope that the same re-

search will give knowledge for effective conservative treatment of corneal disease before it reaches the grafting stage.

The book is worthwhile for anyone doing research or clinical practice of ophthalmology.

T.J.K.

SIGHT: A HANDBOOK FOR LAYMEN. By Roy O. Scholz, M.D., with introduction by A. Edward Maumenee, M.D. Garden City, New York, Doubleday & Company, Inc., 1960. Board cover. 166 pp. 13 line-cut diagrams. 19 chapters plus glossary. $3.50.

A small book full of correct information on the eye. One hundred and fifty-eight pages of clear conversational type of advice to the layman fills the need for the busy practitioner to help his patients understand the function of his eyes. A bit of anatomy, physiology and description of disease symptoms that can be understood by the average adult is found in this book. It is useful for student, general practitioner, nurse, and nurse aid.

W. L. B.

THE OPTICAL INDUSTRY DIRECTORY. By The Optical Publishing Company of Lenox, Mass. 1960. $7.50.

About 400 items important to the industry — instruments, components, raw materials and services are listed. Current information concerning 1200 American company sources capable of furnishing these items and a complete catalog of all corrected lenses, both domestic and foreign, are included.

This sixth edition is completely revised to make it current. It reflects the great number of changes in products and company organizations that have occurred since the 1959 issue of the Directory.

W. L. B.

ANATOMY AND HISTOLOGY OF THE EYE AND ORBIT IN DOMESTIC ANIMALS. By Jack H. Prince, F.B.O.A., F.R.M.S., F.Z.S. (Eng.); Charles D. Diesem, D. V. M., Ph.D.; Irma Englitis, M.D., and Gordon L. Ruskell, F.B.O.A., Springfield, Ill., Charles C Thomas, 1960. Board cover. 307 pp. with tables, diagrams and figures. $15.75.

Designed and written particularly for veterinary students, this textbook-atlas is well illustrated by drawings, diagrams and photographs of anatomical and histopathological specimens and sections. There are 186 figures in black and white and one view of a dog's fundus in color. Index and bibliography.

W. L. B.

DICTIONARY OF VISUAL SCIENCE. By Dr. Max Schapero[1], Dr. David Cline[2] and Dr. Henry William Hofstetter[3]. ([1]Professor of Optometry at the Los Angeles College of Optometry and Director of the Orthoptics, Aniseikonia and Contact Lens Clinics; [2]Member of the American Academy of Optometry; [3]Professor and Director of the Division of Optometry, and a member of the Board of Directors of the National Board of Examiners in Optometry.) Philadelphia, Pa., Chilton Company, 1960. Board cover. 785 pp. $15.00.

"A modern comprehensive dictionary covering the visual sciences." This handy volume lists terms used in the clinical and basic sciences appertaining to the broad spectrum of vision. Definitions are practical and brief, adequate for understanding but not too technical. It was compiled under the direction of the editors with the aid of more than 60 specialists in the fields of optics and refraction from schools of optometry throughout the nation. For readers of journals in the visual sciences it will serve the purpose intended at a great saving of searching through a number of medical and general dictionaries and encyclopedias. It will be a good addition to any medical library. W. L. B.

LISTING OF AUDIOMETERS

The following audiometers are recommended for listing by a subcommittee of the Committee on Conservation of Hearing, American Academy of Ophthalmology and Otolaryngology:

PURE TONE AUDIOMETERS

Beltone Model 10-C Model 15-C	Beltone Hearing Aid Company Audiometer Division 2900 West 36th Street Chicago 32, Illinois
Maico Model MA-5 Model H1-B for pure tones only	Maico Electronics Inc. Maico Building 21 North Third Street Minneapolis 1, Minnesota
Sonotone Model 91	Sonotone Corporation Elmsford, New York

SPEECH AUDIOMETERS

Grayson-Stadler Model 162	Grayson-Stadler Co. West Concord, Massachusetts

SCREENING AUDIOMETERS

Ambco Otometer 600	Ambco Inc. 1222 W. Washington Blvd. Los Angeles 7, California

Each model number in the list as a rule indicates the most advanced model of that series. If less advanced instruments are for sale under similar model numbers, it is assumed that they will function as well or better than the more complicated model in a series.

Acceptance for listing means that the audiometer manufacturer has demonstrated the ability to produce one instrument that performs according to A.S.A. specification. It does not imply that any individual instrument will perform within the tolerances. It is obviously beyond the scope of the Listing Committee or the Referee Laboratories to provide production control for audiometer manufacturers and their customers; however, listing does indicate that the product of the manufacturer can come up to 1951 A.S.A. specifications, and it is up to the customer to carry on negotiation with the manufacturer if a particular instrument which he receives is faulty.

Abatron D-100 and Ambco Oto-chek 800 were removed from the above list at the request of the respective manufacturers.

NEWS AND ANNOUNCEMENTS

XIX INTERNATIONAL CONGRESS OF OPHTHALMOLOGY

Since a large number of American ophthalmologists wish to attend the XIX International Congress of Ophthalmology to be held at New Delhi, India, December 3 to 7, 1962, plans are under way to arrange for group transportation to New Delhi and for pre- and post-Congress tours. The advantages and financial savings which will accrue to us because of group travel are considerable.

In order to fit our plans to meet the needs of the entire group, inquiries should be sent before March 1, 1961, to Peter H. Ballen, M.D., 131 Fulton Avenue, Hempstead, L. I., N. Y.

TWENTY-THIRD ANNUAL de SCHWEINITZ LECTURE

The Twenty-Third Annual de Schweinitz Lecture was presented at a meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia on November 17, 1960, by Dr. Frank B. Walsh, professor of ophthalmology of the Johns Hopkins University School of Medicine. The subject of Doctor Walsh's address was "Concerning the Optic Chiasm, Selected Pathologic Involvements and Clinical Problems."

1960 SCHOENBERG MEMORIAL LECTURE

Derrick T. Vail, M.D., eminent Chicago ophthalmologist and Head of the Department of Ophthalmology at Northwestern University Medical School, will present the 1960 Schoenberg Memorial Lecture at 8:15 p.m. on Monday, December 5, at the New York Academy of Medicine, 2 East 103 Street, New York. Dr. Vail's topic for the address will be "The Problems of a Medical Editor."

Winner of the 1959 Leslie Dana Gold Medal Award for meritorious work in the field of sight conservation and prevention of blindness presented by the St. Louis Society for the Blind, Dr. Vail is recognized internationally as a distinguished teacher, author and leader in advancing ophthalmological practice. He is editor-in-chief of the "American Journal of Ophthalmology."

The lecture series was established by the National Society for the Prevention of Blindness and the New York Society for Clinical Ophthalmology to honor the memory of Mark J. Schoenberg, M.D., the late New York ophthalmologist who was the founder of the New York Society for Clinical Ophthalmology and first chairman of the National Society for the Prevention of Blindness glaucoma committee.

All physicians are welcome to attend.

TRAVEL FUNDS FOR JUNIOR INVESTIGATORS

Funds to cover the cost of round trip air coach travel are available to junior investigators engaged in or receiving training in the neurological, otolaryngological, and related sciences who plan to attend the following international meetings:

1. Seventh International Congress of Neurology, September 10-16, 1961, Rome, Italy
2. Fifth International Congress of Electroencephalography and Clinical Neurophysiology, September 7-13, 1961, Rome, Italy
3. Fourth International Congress of Neuropathology, September 4-7, 1961, Munich, Germany
4. Seventh International Congress of Otorhinolaryngology, July 23-29, 1961, Paris, France

These funds have been made available through grants to the Selection Committee from The National Institute of Neurological Diseases and Blindness, Public Health Service, and the National Science Foundation.

Requests for these travel funds can be made by letter addressed to the Executive

Secretary of the Selection Committee:

Dr. Adolph L. Sahs
Department of Neurology
State University of Iowa
Iowa City, Iowa

The letter should include a brief summary of the applicant's educational, occupational, and research background, and should indicate his major field of interest. The letter should be signed by the applicant and countersigned by his administrative executive.

The deadline for the receipt of requests is March 1, 1961. The Selection Committee will inform applicants of its action by April 15, 1961.

AMERICAN ASSOCIATION FOR THE STUDY OF HEADACHE

The American Association for the Study of Headache was organized at the time of the Annual American Medical Association meeting in Miami. The following officers were elected: President, Henry D. Ogden, M.D., New Orleans; Vice President, Walter C. Alvarez, M.D., Chicago; Treasurer, Robert E. Ryan, M.D., St. Louis; secretary, Bayard T. Horton, M.D., Rochester, Minn., and Moderator, George T. Waldbott, M.D., Detroit.

The Association welcomes to its membership any physician—specialist, or general practitioner—who is interested in the study of headache. Further information can be obtained from the Secretary, Dr. Bayard T. Horton, Mayo Clinic, Rochester, Minn.

MEETINGS

West Virginia Academy of Ophthalmology and Otolaryngology

The West Virginia Academy of Ophthalmology and Otolaryngology will hold its annual meeting at the Greenbrier Hotel, White Sulphur Springs, West Virginia, April 6 to 8, 1961.

The guest speakers on ophthalmology will be Dr. Irving H. Leopold of Philadelphia, and Dr. Harvey E. Thorpe of Pittsburgh.

The guest speakers on otorhinolaryngology will be Dr. John J. Shea of Memphis, and Dr. F. Johnson Putney of Philadelphia.

In addition to the scientific program, the techniques of contact lens fitting will be discussed and demonstrated.

For additional information, please write to the secretary, Dr. Worthy W. McKinney, 109 East Main Street, Beckley, W. Va.

Research Study Club of Los Angeles

The Research Study Club of Los Angeles announces its Thirtieth Annual Mid-Winter Convention in Ophthalmology and Otolaryngology January 23 through 27, 1961, at the Statler Hilton Hotel, Los Angeles.

Guest speakers for ophthalmology will include Dr. Med. Gerd Meyer-Schwickerath; Lorenz E. Zimmerman, M.D.; Dr. Juan Heatley; Robert L. Tour, Ch. E., M.D.; Robert E. Christensen, M.D., and Robert J. Schillinger, M.D.

Guest speakers for otolaryngology will include Oscar J. Becker, M.D.; F. W. Davison, M.D.; Peter N. Pastore, M.D.; Harold F. Schuknecht, M.D.; Charles A. Brubaker, M.D.; Victor Goodhill, M.D.; Howard P. House, M.D.; Max Pohlman, M.D.; Joel J. Pressman, M.D., and Henry J. Rubin, M.D.

For further information, please write Norman Jesberg, M.D., Treasurer, 500 South Lucas Avenue, Los Angeles 17.

The Ophthalmological Society of The United Kingdom

The Annual Congress of the Ophthalmological Society of the United Kingdom will be held at the Royal Society of Medicine, 1 Wimpole Street, London, W.1, on April 13, 14 and 15, 1961.

The subject for discussion will be "Neovascularization in Ocular Disease." There will be a symposium on "The Late Complications of Aphakia." The 1961 Bowman Lecture will be delivered by Miss Ida Mann of Perth, Australia, on "Climates, Cultures and Eye Diseases."

New York Eye and Ear Infirmary

The Annual Spring Meeting of the Alumni Association of the New York Eye and Ear Infirmary will be held April 17 to 20, 1961.

In ophthalmology, symposiums will be given on Diagnostic Work-Up, Medical Management, and Surgical Management of Glaucoma. There will also be courses on related subjects and a closed circuit television demonstration of surgical procedures.

In otolaryngology, there will be symposiums on Otosclerosis and Benign Lesions of the Larynx, as well as lectures and closed circuit television demonstrations.

Additional information may be obtained by writing to Dr. John R. Finlay, Secretary, Alumni Association, 218 Second Avenue, New York 3.

Florida Midwinter Seminar

The Fifteenth Annual Florida Midwinter Seminar in Ophthalmology and Otolaryngology will be held January 29 to February 4, 1961, at The Americana Hotel, 9701 Collins Avenue, Miami Beach.

Lectures on ophthalmology will be presented January 30, 31 and February 1 by Walter S. Atkinson, M.D.; William Havener, M.D.; Charles E. Iliff, M.D.; Irving Leopold, M.D., and Alfred Maumenee, M.D.

Lectures on otolaryngology will be presented February 2, 3 and 4 by John F. Daly, M.D.; Paul Holinger, M.D.; Dean M. Lierle, M.D.; and Harold Schuknecht, M.D.

For further information, please write to Kenneth Whitmer, M.D., 550 Brickell Avenue, Miami.

WILLS EYE HOSPITAL

The Thirteenth Annual Clinical Conference of the Staff and Society of Ex-Residents of Wills Eye Hospital will be held February 9 through 11, 1961, at the Wills Eye Hospital in Philadelphia.

On February 9, there will be Clinic and Hospital Rounds in the morning, special Surgical Clinics in the afternoon, and a Scientific Meeting of the Ophthalmological Section of the Philadelphia College of Physicians, preceded by a dinner, in the evening. Dr. Frank W. Newell, Professor of Ophthalmology, University of Chicago, will be the guest speaker.

On February 10 and 11, the scientific program will include individual presentations and color television of surgical procedures. Clinical, surgical and research subjects will be presented. The Arthur J. Bedell Lecture will be delivered on Saturday morning by Dr. Michael J. Hogan, Professor of Ophthalmology, University of California.

An informal reception will be held on Friday evening for those attending the Conference. A dinner meeting of the Society of Ex-Residents on Saturday evening will conclude the Conference.

Oklahoma City Academy of Ophthalmology and Otolaryngology

The Annual Spring Meeting of Oklahoma City Academy of Ophthalmology and Otolaryngology with the Postgraduate Department of the University of Oklahoma Medical Center will be held on March 2 and 3, 1961.

Guest speakers will be:

Ophthalmologists:

James H. Allen, M.D., New Orleans

Roscoe Kennedy, M.D., Cleveland

Otolaryngologists:

Z. Z. Godlowski, M.D., Chicago

William House, M.D., Los Angeles

Harold Tabb, M.D., New Orleans

For further information, please write to Dr. E. Norris Robertson, 301 Northwest 12th Street, Oklahoma City.

POSTGRADUATE COURSES
Institute of Ophthalmology of the Americas

The Institute of Ophthalmology of the Americas of the New York Eye and Ear Infirmary announces the following courses:

1. "Retinal Detachment Surgery" by Prof. Ernst Custodis, Director, Eye Clinic, Academy of Medicine, Dusseldorf, Ger-

many. A series of three lectures to be given March 27 to 29, 1961. Fee $30.00.

2. "Pleoptics" by Dr. Heinz Gortz, Docent, Academy of Medicine, Dusseldorf, Germany. A series of two lectures to be given March 30 and 31, 1961. Fee $20.00.

Applications may be made to Mrs. Tamar Weber, Registrar, 218 Second Avenue, New York 3.

Gill Memorial Eye, Ear and Throat Hospital

The Gill Memorial Eye, Ear and Throat Hospital will hold its Thirty-Fourth Annual Spring Congress in Ophthalmology and Otolaryngology and Allied Specialties, April 3 through 8, 1961. There will be twenty guest speakers and fifty lectures.

For further information, please write to E. G. Gill, M.D., 711 South Jefferson Street, Roanoke, Va.

Course in Ophthalmic Plastic Surgery

A three-week intensive Course in Ophthalmic Plastic Surgery will be conducted at the New York Eye and Ear Infirmary, March 20 to April 7, 1961, by the Institute of Ophthalmology of the Americas.

The course will consist of lectures, sessions in doctors' offices, preliminary and follow-up studies of patients that will be operated on during the time of the course, moving picture demonstrations of various ophthalmic plastic procedures, observation and assistance at the operating table on actual surgical cases, cadaver work and lectures and demonstrations, ancillary subjects such as photography, pathology and x-ray radiation.

Anyone interested should contact the Registrar of the Institute, 218 Second Ave., New York 3, or any of the following:

Dr. Wendell L. Hughes, 131 Fulton Ave., Hempstead, L. I., N. Y.

Dr. Byron C. Smith, 722 Park Ave., New York 21.

Dr. J. Gordon Cole, 780 Park Ave., New York 21.

Second Annual Contact Lens Course

The University of Texas Postgraduate School of Medicine announces the Second Annual Contact Lens Course, April 19 to 21, 1961, in Houston. The instructors for this course will be ophthalmologists and experienced teachers. The course will include instruction in all phases of contact lens fitting and adjusting. Closed circuit television will be used during the didactic part of the course.

The course will be limited to 35 Board-certified ophthalmologists or residents and fellows in ophthalmology. Registration will close February 28, 1961. For further information write Office of the Dean, The University of Texas Postgraduate School of Medicine, 410 Jesse Jones Library Building, Texas Medical Center, Houston.

POSITIONS

OPHTHALMOLOGIST — Diplomate of American Board and Fellow of American College of Surgeons desires opportunity to practice in association with a single ophthalmologist or a group of ophthalmologists. Prefer location in Midwest or East. Licensed to practice in Indiana, California, Michigan and West Virginia. For further information, please write Herbert F. Sudranski, M.D., 1002 S. Davis Avenue, Elkins, W. Va.

WANTED: An Associate specializing in EYE, EAR, NOSE AND THROAT is badly needed in good trading center in southeastern Illinois. Wide trade area of 40,000 people. Would consider man limiting practice to ophthalmology. Should be Board certified or Board eligible. For further information please write Dr. C. L. Johns, 114 West Fifth Street, Mt. Carmel, Illinois.

Listings of positions available should be sent to W. L. Benedict, M.D., 15 Second Street S. W., Rochester, Minn., by the fifth of the month preceding publication. They should include (1) type of physician wanted (ophthalmologist or otolaryngologist: diplomate, resident, etc.) (2) type of position to be filled; and (3) to whom to write for further information. Unless otherwise requested, listings will be published only once.

The Academy will handle no further correspondence beyond the listing and assume no responsibility. Neither does it endorse nor guarantee any of the published listings.

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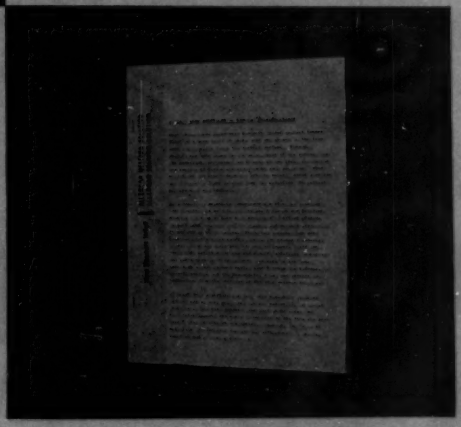

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